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Canadian Wildlife Administration

Wildlife Management — Today and Tomorrow

Northwest Territories Renewable Resources
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Northwest Territories

Wildlife and Habitat Management

Today and in the Future

"The development of the Arctic regions is inseparably linked with the conservation of Canada's wildlife in the Far North. In recent years explorers, prospectors, and traders have been pushing their way into every part of the Northwest Territories with consequent destructive effect on the wildlife. The gradual disappearance of the game animals has become a serious problem to the natives and the Government is taking active measures to counteract this by making provision to conserve and protect the valuabie forms of wild life in the North."
W. H. B. Hoare, 1930.

Written half a century ago, Hoare's remarks appear in a report detailing his investigation of the Thelon Game Sanctuary. The document is remarkable for its low key presentation of arduous travelling and working conditions. His field work began in January 1928, when he left Ottawa, and continued until the fall of 1929, when he returned via Sydney, Nova Scotia. Carried out by dog sled, field-constructed canoe and on foot, it is a task scarcely comprehended by the modern biologist surveying game from his seat in an aircraft.

Yet for all the differences in survey methods, remarkably little else has changed. The superficial face of the north may alter but the scope and vastness of the land and the apparent abundance of the wildlife which Hoare found so gratifying can still be found. The biologist or explorer can still spend months in the field seeing no one but his colleagues. He can walk out of his tent in the morning and be greeted by the sight of caribou stretching to the horizon. He can fly over thousands of hectares of trackless snow and ice observing polar bears which know nothing of man. He can travel, in his mind, back to the last ice age as he comes upon a muskox, an animal so strange in appearance that one's first view is always tinged by astonishment that so prehistoric a beast still lives.

The scope of wildlife in the Northwest Territories is vast. Within its boundaries reside 90 species of mammals and 280 species of birds. Of those, 54 mammals and 35 avian species fall within the mandate of the Government of the N.W.T. This is what awaits the modern day wildlife manager. But, like Hoare, he

must at the same time be aware that trends that were obvious 50 years ago are still a reality and development continues to threaten the wildlife. This paper outlines some of the problems and some solutions facing wildlife and habitat managers in the next few years.

Habitat and Land-Use Assessment
An effort is made to determine the impact of various types of development on wildlife and wildlife habitat. The program includes major projects such as the Cadillac Mine in the Mackenzie Mountains, hydro-electric development on the Slave and Liard Rivers, the Mackenzie Valley pipeline, drilling from artificial islands in the Beaufort Sea, tanker routes and road construction.

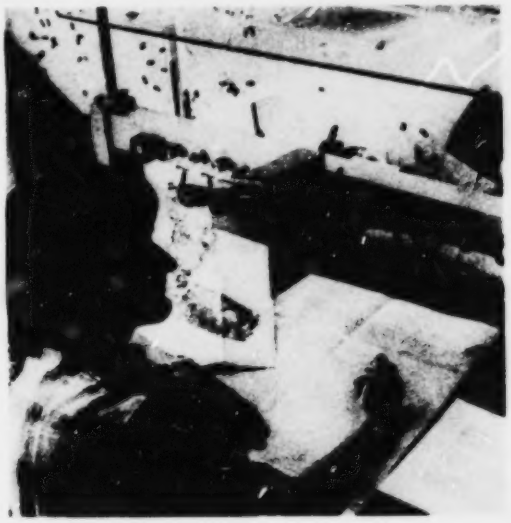
Drilling ships on the Beaufort Sea

In the past two decades, non-renewable resource development has accelerated in the N.W.T. There are currently several operating mines producing gold, copper, lead, zinc, silver and tungsten. Other ore bodies have been identified but are not in production. Oil was first discovered in the N.W.T. in 1920 at Norman Wells and significant discoveries have been made since in the Mackenzie Delta — Beaufort Sea area, in the high Arctic and at Norman Wells. Thus the potential for resource development and its associated wage employment benefits to N.W.T. residents is obvious, but with development comes a host of problems for wildlife and habitat managers. The manager of the future may find himself wearing many hats as he attempts to juggle the demands of all who are demanding their share of the renewable and non-renewable resources of the N.W.T.

Exploration and development bring personnel, heavy equipment, camp construction, increased aircraft activity and new transportation corridors, each of which constitutes its own threat to wildlife and habitat. Disturbance, interference with movements and habitat loss are the most inevitable consequences. To cope with such problems it will be essential that sound land use policies are in effect before development takes place.

The Department of Renewable Resources is presently defining its interest and position on land use planning within the context of the Federal Land Use Planning policy. An important aspect of environmental decision making is the provision for public hearings to judge the adequacy of an environmental impact statement submitted by a potential developer and the desirability of allowing a project to proceed. The Department of Renewable Resources will participate in several environmental review processes during 1983-1984. Most significant will be the Beaufort Sea Environmental Assessment Review Hearings which will assess the social, economical and environmental acceptability of oil and gas development in the Beaufort Sea — Mackenzie Delta area. The Department may also take part in the Arctic Pilot Project Energy Board hearings which will likely continue into 1985. The Arctic Pilot Project is a

Habitat Mapping Project
Using aerial photos, Landsat images, and existing topographical, vegetation and soil maps, the distribution of grizzly bear dens is being plotted within a study area in the Mackenzie Delta. It is hoped that the biophysical profile of known den sites can be applied to other areas, and that the technique can be applied to other species. The results will be incorporated into the Canada Land Data-System.



Delineating grizzly bear habitat on topographical maps

proposal to ship liquified natural gas, year-round, from the high Arctic islands to southern Canada. In 1985-1986, Environmental Assessment and Review Project (E.A.R.P.) (federal) and Energy Review and Conservation Board (E.R.C.B.) (Alberta) hearings will be held for the Slave River Hydro project and also in 1985-1986, hearings for the extension of the Norman Wells pipeline to the Beaufort Sea may take place. The Environmental Planning and Assessment Division of the Department of Renewable Resources has a mandate for environmental protection and must ensure that relevant renewable resource management issues are addressed during the hearings.

Another concern of the Department of Renewable Resources is biophysical studies which are necessary to deal with various future developments such as new base metal mines in the Mackenzie Mountains, iron ore deposits in the Melville Peninsula, pipeline construction, future highways such as the Liard (opens 1983) and mine access roads such as the one to Cadillac Mine. Data are compiled on terrain and soils, hydrology, vegetation and wildlife and their interrelationships. The information is then combined ecologically and areas of land are mapped and categorized. That information is used to assess the suitability of an area for various uses and its sensitivity to development. Thus, the Department of Renewable Resources will be able to judge the impact of resource development projects and protect or avoid critical areas.

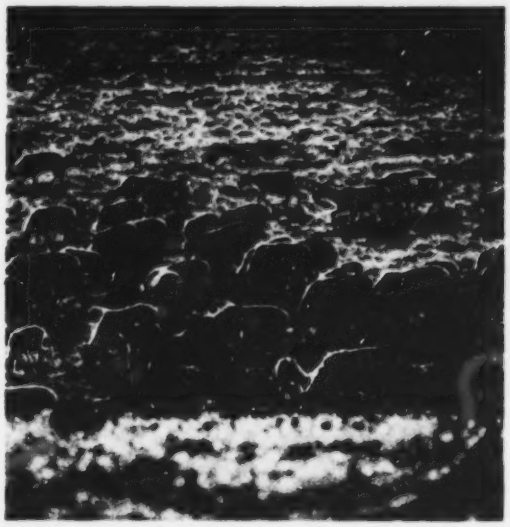
One of the most important resources in the Northwest Territories is wildlife. The N.W.T.

Land Use Information Series (LUIS) Wildlife Mapping Program
Since 1971 general reconnaissance aerial surveys of wildlife have been carried out in the N.W.T. Map sheets have been completed for many areas, including the Mackenzie and Keewatin Districts and are available through Federal map offices. Melville Peninsula and Southampton Island will be surveyed in 1983. The program will conclude in 1989, by which time the entire N.W.T. will have been surveyed.

An N.W.T. Wildlife Service biologist examines the skeleton of a muskox which has been spotted during an aerial reconnaissance survey

Wildlife Service, responsible for the management and conservation of wildlife, is presently completing research on a number of programs throughout the N.W.T. One such concern is the effects of land use operations on calving and post-calving caribou of the Beverly and Kaminuriak herds. The Caribou Protection Measures, under which land use permit holders may be required to cease operations when calving and post-calving caribou are in their permit area, have been in effect since 1978. Despite opposition from mining representatives who have asked for more flexible legislation, delegates to a March 1983 meeting of the Caribou Management Board felt that while the restrictions are adequate for current land use operations, changes should be made for the future. The Caribou Management Board feels that interim measures are adequate for regulating temporary land use activities but that calving areas should be completely protected from development.

Other concerns of the N.W.T. Wildlife Service will be issues relating to the effects of roads on wildlife. The Liard Highway could cause a problem for moose in the area, but the most important concerns at the moment are with winter roads which are constructed to support exploration and mining activities. Improved access for hunters is the most serious effect of new roads on movements, and size and structure changes in wildlife populations. The N.W.T. Wildlife Service is developing techniques that will enable biologists to study the effects of roads or other linear developments on caribou distribution.



Caribou Monitoring Program
This program began in 1978 and is designed to provide land managers with information about patterns of range use by barren-ground caribou of the Beverly and Kaminuriak herds. The information is used to minimize conflicts between land-use operations and caribou during migration, calving and post-calving periods.

Nursery band of barren-ground caribou

Radio-Collaring of Polar Bears
Adult females are radio-collared in Alaska and Canada to determine their movements, denning sites and productivity. So far, 40 animals have been collared, 20 in Canada and 20 in Alaska. Aerial surveys are conducted once a month and will continue for the next 12 months. The program has been going on for a year and a half.

Radio-collaring a polar bear

The N.W.T. Bear Deterrent and Detection Research Program
During the 1982 program, approximately 250 polar bears were successfully deterred with rubber bullets fired from a riot gun, from inside and outside a steel cage. More research is planned in 1983, and personnel will be trained in techniques used in dealing with nuisance bears.

Polar bear observation tower with steel safety cage at right

An important effect of increased exploration and development is the influx of people to the north. It is estimated that as a result of the Beaufort Sea development project, the combined populations of Inuvik and Tuktoyaktuk will increase from about 3,500 people to as many as 15,000. That in turn, will increase pressure on wildlife resources through recreational hunting, disturbance and habitat alienation. To meet the pressures of Beaufort Sea development and ensure sound wildlife management, the N.W.T. Wildlife Service is carrying out studies to gather more baseline data on polar bears, grizzly bears, muskox, raptors and caribou. Polar bear tag and recapture studies, as well as radio collaring programs will aid in determining the distribution and abundance of polar bears in the area. Distribution and abundance surveys of muskoxen will be completed north of Great Bear Lake and on the west side of Victoria Island, and population reproduction studies of the Bluenose caribou herd will determine if the current quota of 800 animals is adequate or excessive. Bear detection and deterrent research programs are also being carried out. Successful deterrent methods will be a positive step toward reducing kills and improving safety for people working in the Beaufort Sea area where both grizzly bears and polar bears are common.

At the same time as wildlife managers are coping with preserving habitat and wildlife in the face of advancing industrial development, they are confronted by traditional users of the land who are concerned about encroachments on their lifestyle. Native people are directly in the middle of various controversies. On the one hand, they are being en-

Caribou Research
Research on the ecology and behaviour of barren-ground caribou on the Beverly calving ground has been carried out during the last three years to provide preliminary information on the potential effects of mineral exploration on caribou cows and calves. A sampling design was field-tested for recording undisturbed behaviour of cow-calf pairs. The results were compared with disturbed behaviour caused by helicopter landings.

Survival of calves from birth to 1 year of age was assessed from studies on the calving ground in June and on the winter range, 600-800 km to the southwest, in the fall and spring. Causes of mortality on the calving ground were determined from direct examination of calf carcasses, and survival was based on the proportion of calves to adult cows throughout the year.

Abandoned 3-4 day old barren-ground caribou calf

couraged and educated towards wage employment, which in the Northwest Territories usually means working either for government or for industry, while on the other hand, they perceive industrial development to be altering their land and their lifestyles. Wildlife and habitat managers who are trying to protect the resources from development also come under suspicion from native groups.

Some of the concerns of native groups regarding caribou were aired in 1980 in a series of taped interviews called "Kaminuriak — Caribou in Crisis." The interviews permitted all those who are concerned with the future of the Kaminuriak caribou to speak openly about the problems they perceived. It is apparent from the tapes that many native hunters are dissatisfied not only with the operations of exploration companies in the Baker Lake area but also with the work and findings of biologists conducting surveys on the caribou herd. The distrust recently exploded during the February 1983 sitting of the N.W.T. Legislative Assembly when a motion was passed to discredit the government biologists who carried out past caribou surveys, and to ensure that Inuit participate in all future surveys. The motion was precipitated by the information that the 1982 surveys of the Beverly and Kaminuriak herds showed far more caribou than previous surveys had done.

In exercising its mandate to conserve and manage wildlife and habitat, the Department of Renewable Resources also faces myriad other questions. Requests for increased quotas on restricted wildlife such as polar bears, grizzly bears and muskoxen; an increasing number of General Hunting Licence holders who have virtually unrestricted hunting rights and wish to exercise them; the need for trapper education programs in a diminishing fur market, and many more issues often demand unique and inspired responses.

It is becoming apparent that traditional users of the land and the wildlife must be more directly involved in management programs. One of the main concerns of the N.W.T. Wildlife Service in the next few years will be a decentralization program. Future wildlife management programs will have greater participation from native communities and organizations. Within the Wildlife Service itself, this will mean that many functions of regulation, inspection and gathering of research and management data, currently the responsibility of the central office, will be

Caribou Census
Most caribou research in the N.W.T. is directed toward assessing herd size and trend. This is done primarily by estimating the number of females during the peak of calving in early June. Research is underway to improve that technique through the use of aerial photography. Data are also collected on calf survival and the number of caribou shot by hunters. On Baffin Island, caribou are ear-tagged, and returns from hunters help describe herd distribution and movements. The relationship between caribou condition and food availability is being studied on Coats Island where there are no predators.

Ear-tagging a caribou on Baffin Island

Bird of Prey Program
Extensive helicopter surveys will be conducted in 1983 in selected areas from Coppermine to Pangnirtung. Gyrfalcons are the major focus because of the gyrfalcon harvest program, but considerable work is carried out on peregrine falcons also. An intensive study of arctic peregrine falcons is being conducted in Rankin Inlet, by a graduate student of the University of Alberta under the supervision of the Regional Biologist. Peregrine observations, as well as the locations of golden eagle, rough-legged hawk and raven nests are also recorded during the gyrfalcon surveys.

Biologists climb down to a gyrfalcon nest to tag chicks

carried out at the regional and community level. An example of local participation in wildlife management now is the allocation of quotas. Two species, muskoxen and polar bear, are currently hunted under a quota system with allocation determined by local Hunters and Trappers Associations. If the hunting of certain caribou herds is limited in future by quotas, it will become the responsibility of regions and communities to determine who is a subsistence hunter and how quotas should be allocated.

Some steps towards decentralization have already been taken. The Beverly/Kaminuriak Caribou Management Board formed in 1981 is an example. Its members are representatives of the governments of Manitoba, the N.W.T. and Saskatchewan, as well as the traditional users of the caribou from the N.W.T., Manitoba and Saskatchewan. One ongoing program is the publication of "Caribou News" whose purpose is to contribute to the efforts of governments and native people in managing the herds. Future priorities of the Kaminuriak Management Board and soon to be formed Bathurst Management Board are to implement more school and public awareness programs and to draft a management plan which will deal with such issues as the effects of fire on winter caribou habitat, predator control on caribou ranges, improved methods of gathering harvest statistics, winter roads and their relationship to caribou, and calving ground protection measures.

As well as maintaining wildlife populations, the mandate of the N.W.T. Wildlife Service is to encourage the wise use of wildlife to meet the requirements of the residents of the Northwest Territories and to assist communities in developing prudent harvesting practices. The most important wildlife resource throughout the north is caribou, and to native people raised in a tradition of using caribou for food, warmth and shelter, to be deprived of caribou is to be deprived of a lifestyle. Many hunters regard hunting restrictions on caribou and other wildlife as infringements of their aboriginal rights and resist talk of quotas and restricted seasons. An important ongoing task of the Conservation Education Section of the Department of Renewable Resources is to design programs which will communicate to people throughout the Northwest Territories what the managers are attempting to do, and their reasons. As part of the decentralization process, Conservation Education Officer positions and programs are being created in the five regions.

In the past, the value of wildlife to native people was in its use as food and clothing. With the coming of Europeans, wildlife products, particularly furs, took on a cash value when they could be traded for goods. Recently, the cash value of some wildlife has escalated, putting greater emphasis on the need for prudent conservation practices. An increased tourist trade will put more pressure on products such as artifacts made from bone and ivory, as well as luxury hides such as those from polar bear and muskox. A large cash value has also recently been established for gyrfalcons. Requests from Inuit associations to capture gyrfalcons for commercial purposes have led to new policies, regulations and the development of future gyrfalcon studies. An annual quota of 20 young-of-the-year birds was established in 1982 with no more than seven birds to be captured in any one region. Only Hunters and Trappers Associations in the Arctic communities can apply for the quotas. The trapping season is from 7 September to 31 October and all trapping is to be monitored by N.W.T. Wildlife Service personnel. A survey of gyrfalcons begun in 1982 will be expanded in 1983 and an extensive study of the reproductive ecology of gyrfalcons will also be conducted.

The potential value of furbearing wildlife should also increase. However, international anti-trapping attitudes have already seriously affected the fur-buying market with subsequent consequences to hunters and trappers in the N.W.T. In the next few years, the N.W.T. Wildlife Service will follow the lead of such agencies as the newly created Fur Institute of Canada which intends to further experiment with humane trapping methods and develop trapper education programs to ensure that new trapping methods will be implemented. Public awareness programs will also be developed to counteract the anti-trapping lobby which is growing in Canada and abroad.

These are only a few of the issues facing the Department of Renewable Resources over the next few years. There will be many more and, because of the nature of the N.W.T., many will be unique with precedent-setting solutions. The Northwest Territories is changing faster than any province or territory in Canada. Only a generation ago its people had little thought of ownership of land or development. Most still lived on the land, hunting and trapping as their ancestors had done and there was little need for intensive management of wildlife or enforcement of

Mackenzie Wood Bison Sanctuary
The 18 wood bison introduced into the Mackenzie Bison Sanctuary have increased exponentially until they now number in excess of 1,000 animals. A survey in March, 1983, found that a sub-population of more than 50 animals had branched off and is now breeding in an area approximately 50 km west of the Sanctuary.

Aerial reconnaissance of wood bison

regulations. Industrial and political development over such a short time has brought with it uncertainty and frequent displeasure and anger among indigenous and recent residents of the north. The role of wildlife and habitat managers under the circumstances is a difficult one. Their business is management, yet pushed by those who would develop the land and chastized by others who would have it left alone, the wildlife or habitat manager becomes an arbitrator, a law-enforcer and an educator.

Managers in the Northwest Territories have a unique opportunity to practice wildlife and habitat conservation. Not only are the resources present in almost overwhelming numbers but the N.W.T. Wildlife Service and the Habitat Management Division have the full support of their department and their funding agencies. The balance between development and maintenance of wildlife is the first goal of the Department of Renewable Resources and a high priority of the Government of the Northwest Territories which recently approved the Department's expanding budget in a time of recession and cutbacks.

Not only do Northwest Territories managers have the resources and the finances, but they also have the time. Despite the rate of change, the Northwest Territories is still huge, still relatively unpopulated and still largely undeveloped. It is quite likely that it will remain so for well into and beyond the next century.

Jonquil Graves
Department of Renewable Resources

Yukon

Wildlife Management in Yukon

Now and in the Future

The years 1973-83 will be remembered as important years for wildlife management in the Yukon. Prior to 1970, wildlife management in the Yukon consisted of selling licences and controlling predators. In 1973, Yukon's first territorial biologist was hired and since that time, our management staff has grown to seven biologists, each with a management specialty. Since 1973, the main emphasis of wildlife programs has been to inventory wildlife populations throughout the territory as well as gaining understanding of the basic ecology of our wildlife populations. Although these programs are still high priority and ongoing, some emphasis is now shifting towards applying our baseline inventories towards programs that enhance wildlife populations in the Yukon. This article highlights some of the past and future directions for the Department of Renewable Resources.

Thinhorn Sheep

Since 1974, the majority of the sheep management budget has been directed towards inventory surveys of each of the 22 outfitting areas. To date, all but three of these areas have been surveyed for sheep. Recently, work has been initiated to determine the cause of deformed horns and "lumpy jaw," and factors affecting horn growth.

In May 1983, wildlife management for Yukon will take a great step forward when our first prescribed burn occurs. This burn, being carried out in conjunction with Federal Department of Lands and Forests in the Kluane Lake region, will improve winter range for a population of 400 Dall's sheep. It is hoped that the knowledge gained from this burn can be applied to future burns with similar objectives. As well, the possibility exists to expand the program to include habitat improvement projects for moose.

Mountain Goats

Mountain goats are found in scattered populations throughout the southern Yukon, the majority being found in Kluane Park and Kluane Game Sanctuary. Most inventory conducted on mountain goats has been done incidentally to sheep inventories.

Because of the low population size and susceptibility to hunting, most of the Yukon is closed to mountain goat hunting. In order to reestablish populations on previously inhabited ranges and to enhance tourism potential of wildlife, the Department of Renewable Resources will conduct its first reintroduction of mountain goats in the White Mountain area of south central Yukon this year. Hopefully it will be the first of a series of reintroductions of both mountain goats and Dall's sheep.

Caribou

Yukon hired its first caribou biologist in 1976 over concern of the fate of the large Porcupine caribou herd after the construction of the Dempster Highway. This highway bisected the winter range of the herd with the potential to disrupt migrations across the highway. Research was directed towards monitoring movements, documenting critical habitat areas and examining the impact of the highway on the herd.

It was not until the possibility of the Alaska Highway Pipeline that any attention was given to our numerous southern woodland caribou herds. Since 1980, a definite effort has been made to gather some baseline data on these smaller woodland herds. To date, eight herds have been examined, and it is with the last of these, the Finlayson Lake herd, that we have embarked on an important management program in 1983. The Finlayson Lake caribou herd is the first herd that we feel is in a severe decline based on our surveys which indicate high juvenile mortality, high wolf population, and a high, primarily native, harvest. We proposed a three phase program:

1. wolf control
2. regulate a bull only sport harvest
3. conduct a vigorous education program in the native communities in order to reduce native harvest voluntarily.

The results of this program will be closely monitored over the next 3 years.

Moose

Other than sporadic winter range surveys, very little effort had been directed towards Yukon's "bread and butter" species until 1978, when our first full-time moose biologist was hired. Adopting a sophisticated stratified block sampling technique used by Alaskan moose specialists, our Department inventoried the first of six priority moose areas in southern and central Yukon. In the initial year, 1981, over 19,000 square kilometres (7200 sq. mi.) were surveyed. The results indicated that we have a low density, stable moose population, with localized overhunting in accessible areas. As well, the extremely low survival rate of calves combined with a high demand by hunters for adults, indicated that we will eventually see serious declines. Similar parameters were documented in the expanded 1982 surveys. Following similar experiences in Alaska, predation by wolves and/or bears, and hunting, were postulated to be the most important contributing factors limiting moose population. As a result, in 1983, we have initiated an intensive study to document the causes of moose calf mortality and, if wolves are major contributors, to examine the response of moose to wolf removal. The study involves radio collaring wolves from packs in the area to determine density, home range sizes, movements and kill rates. As well, over 60 moose cows and 60 calves will be fitted with mortality collars to determine magnitude and cause of mortality and verify the cow/calf ratio in fall surveys. This program will continue for 3 years. The results of this study, the first of its magnitude in the Yukon, will greatly enhance our ability to manage moose populations in the future.

Grizzly Bears

Yukon's first full-time grizzly bear biologist was hired in 1978 primarily over concerns about our predominately female grizzly harvest over a large area of the Yukon. Initial objectives of the position were quickly realized when, in 1980, all outfitters were placed on a quota system based on our "best guess" estimates of bear densities within their areas. Outfitters were encouraged and educated to select primarily males to fill their quotas and the results have been extremely encouraging. Resident harvest has been increasing steadily and in 1982, we implemented a one-in-five-year grizzly for resident hunters. Present and future efforts are being directed towards "fine-tuning" density estimates, public education to reduce nuisance grizzly bear kills, and examining the role of grizzly bears in moose calf mortality.

Moose being fitted with radio collar

Furbearers

Trapping is a significant primary industry in Yukon, with close to 800 trappers deriving their winter income from the harvest of furs, valued at $1.5 million annually. Past furbearer management in the Yukon has been primarily focused on trapline management, the health of the industry being a measure of the health of the populations. However, over the last 2 years, systematic inventory/indexing of aquatic and terrestrial furbearers have been initiated as a part of the Yukon River Basin Study. The furbearer populations are also being monitored with fur harvest data, trapper questionnaire response and biological population monitoring studies. As well, a number of research projects have been conducted and/or sponsored by our Department. The demography of pine marten and wolverine are two of the important management oriented programs.

Since 1976, when our furbearer biologist was hired, trapper education has been a major concern of our Department. Encouraging use of traplines and biological trapline management, introducing new trapping methods and demonstrating proper skinning and handling methods have been part of this program.

Raptors

Raptor management in the Yukon is presently at an exciting stage of its development. In the past, systematic watershed inventories have been the prime thrust. Beginning in 1978, in an effort to reduce the attractiveness of gyrfalcon poaching, our Department pioneered a controlled harvest of gyrfalcons from our well monitored northern population and encouraged the development of private breeding facilities to support the program. As well, in 1978, the Department initiated a program to reintroduce peregrine falcons into our remnant Yukon populations. These reintroductions have been very successful. At a breeding facility at the Yukon Game Farm, we are now attempting to breed tundra peregrines. The last pair of Yukon tundra peregrines vanished in 1981. Three pairs are now being closely watched at our breeding facility; their young will be reintroduced to the North Slope.

Wolves

1982 was the year of the wolf in the Yukon. Three coincident happenings converged to focus considerable attention on the wolf, a species too long ignored in our management efforts. The first two happenings were already mentioned — the concern in the same year over our southern moose populations and the suspected decline of the Finlayson caribou herd. The third happening resulted in the majority of attention; that of a serious increase in complaints from livestock and pet owners over wolves in the Whitehorse area. As a direct response to these situations, we have:

1. attempted to remove wolves from the Whitehorse area,
2. begun wolf control in the range of the Finlayson caribou herd, and,
3. initiated a study of wolf density and their relation to prey in the southern Yukon.

As an indirect result of these situations, we have:

1. reassigned one staff member to oversee wolf management,
2. initiated a series of wolf trapping workshops to educate trappers as to more effective trapping and snaring techniques,
3. initiated a cash incentive program to stabilize wolf pelt value to trappers, and
4. been forced to establish some logical management strategies for this valuable resource.

Waterfowl

The Yukon's cooperative relationship with the Canadian Wildlife Service in managing waterfowl has had a relatively short but fruitful history. Beginning in 1975 when the Department of the Environment funded Yukon's initial investigation of waterbirds using the Old Crow Flats, a series of projects has been conducted identifying significant wetland areas and detailing the ecological parameters associated with their use by waterfowl. C.W.S. staff involvement has built over the years, and it has been gratifying to observe the effort successfully spent keeping the two levels of government working jointly in this effort. Of particular interest lately, have been contributions we have been making in understanding the function of fall and spring staging areas in the southern Territory. As well, the initial steps have been taken toward writing the Yukon Regional Waterfowl Plan.

Upland Game Birds

Yukon's seven species of grouse and ptarmigan are recognized in our management efforts because they absorb a relatively high percentage of recreational hunting effort and supply an important prey base for valuable predators such as furbearers and raptors. Our management of grouse has been greatly assisted by long-term research of willow ptarmigan population ecology dating from the early 1960's. Several censuses of willow ptarmigan numbers have been conducted since the early 70's primarily to monitor the wide and regular fluctuations in abundance, to which they are susceptible. Four widely spaced populations are censused from the arctic slope to the southern border. In the late 70's, it became evident that the sharp-tailed grouse was disappearing from parts of its former range in the territory. It was identified as one species which would be vulnerable to damage due to transport corridor development in the south Yukon associated with the Foothills pipeline proposal. Work was funded by that company and initiated by our staff. We were able to make significant contributions to our knowledge of the birds' ecology and population dynamics in the Yukon. Hunting restrictions were consequently designed and habitat manipulation through controlled burning has been proposed to effect the recovery and survival of the species.

The Future

The youthful stage of Wildlife Management in the Yukon will undoubtedly mature in the future. More public involvement and enhancement of the resource for tourism are two areas that will receive considerably more attention. The settlement of native land claims will have a tremendous but as yet uncertain impact on wildlife management in Yukon. We are fortunate that the resource is still plentiful at a time when the collective knowledge of wildlife management in North America is rapidly increasing.

Don Russell
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Alberta

The Wetlands For Tomorrow Program

In June 1982, the Province of Alberta signed a major wetlands conservation agreement with Ducks Unlimited (Canada). The resulting program is known as Wetlands For Tomorrow.

As stated in the agreement document: "The purpose of the Agreement is to allow Alberta and Ducks Unlimited to undertake joint development programs for the implementation of management plans through Subsidiary Agreements for the enhancement and conservation of wetlands in Alberta for a broad range of public benefits." The Agreement carries an initial term of ten years from April 1, 1982 to March 31, 1992 with the capability for five-year extensions at intervals of five years by mutual consent of the parties.

Twenty "key wetlands" provide the basis for this initial Agreement (see Figure). The wetlands range from smaller production marshes of local or regional significance to larger waterbodies noted for their provincial importance to staging waterfowl. The selection of these wetlands was based on several criteria: provincial habitat value to the waterfowl resource; recreation significance and proximity to urban centers; degree of susceptibility to water or land use impacts; joint interest by Alberta Fish and Wildlife and Ducks Unlimited (Canada); and an adequate data base to permit initiation of habitat development. It is understood that other wetlands may be substituted by agreement for those listed.

The intent is to develop and implement management plans for these 20 wetlands over the ten-year period. While these management plans will be jointly implemented by the two parties, it is generally considered that the majority of capital construction costs will be borne by Ducks Unlimited (Canada) while securing the land base, including acquisition of private lands, will be the responsibility of the Province. A joint Subsidiary Agreement, based on the management plan, will be signed for each wetland wherein specific development, management and maintenance responsibilities of each agency will be outlined. The prevention of agricultural damage by waterfowl will be an integral part of management plans where it is anticipated to be a problem. It is intended that each wetland management area be formally designated under the Wildlife Act by Order in Council.

Coordination of government and public input into specific wetland management plans is the responsibility of the Fish and Wildlife Division. In order to facilitate this process within government, a steering committee has been established which has representation from key government agencies: Environment, Agriculture and Public Lands. While the public input process has not been defined, it will ensure ample opportunity for review and comment by those land owners in the immediate vicinity of the management area.

The Agreement does not preclude the requirement for consideration and integration of other land use and resource management interests associated with these key wetlands. What it does do is focus the coordinated efforts of a government agency, responsible for wildlife management, and a private organization, dedicated to wetlands conservation. It is hoped the Wetlands For Tomorrow program will prove an effective vehicle in making a significant contribution towards the enhancement and management of Alberta's key wetlands.

Brent J. Markham
Wildlife Branch
Fish and Wildlife Division
Department of Energy and Natural Resources

Location of Key Wetlands

1. Beaverhill Lake
2. Bens-Watt Lakes
3. Big Lake
4. Big Hay and Bittern Lakes
5. Buffalo Bay — Horse Lakes
6. Buffalo and Spotted Lakes
7. Chip Lake
8. Cygnet Lake
9. Hay-Zama Lakes
10. Kleskun Lake
11. Little Red Deer Marsh
12. Manawan Lake
13. Many Islands Lake
14. Marion Lake
15. Peace-Athabasca Delta
16. Stirling Lake
17. Tyrrell and Rush Lakes
18. Utikuma Lake
19. Vauxhall Marsh Complex
20. Whitford and Rush Lakes

LOCATION OF KEY WETLANDS

Alberta

Management by Planning

The Fish and Wildlife Resource Plan for Alberta

"How many moose do we have, where are they, how are they doing, and what are you going to do about them?"

The same question, in different forms and for different species, is fired at Fish and Wildlife staff daily by other government agencies, politicians, industries, recreation groups, etc. The immediate gut response is, "Give me some money and manpower so I can do some decent surveys and inventories and I'll tell you."

Alberta Fish and Wildlife staff have decided that they could no longer afford to wait for that day and that they would have to try to answer these questions on the basis of "best available knowledge." The decision to develop a resource plan at this time was also aided by the increasing pressure on the resource, especially on the habitat base, and by the ratification of the *Policy*, which among other matters, committed the Minister to make a periodic declaration of the "state of the art" and committed the government to ensuring that appropriate use was made of the resource and that it was passed on to succeeding generations *as it was received*. This meant that someone had to establish how it was received in 1982 and how it was going to be used to ensure that it was passed on to succeeding generations.

The Resource Plan establishes in a concise form, the past and present provincial supply, the past and present use, and the goals to the year 2000 (population, user and habitat goals) for each species or species group. It also predicts what will happen to these species if the goals are not met. This document has been completed and is being reviewed by staff, public interest groups, and cabinet committees in anticipation of being ratified by the Caucus in late 1983. A supplementary document starts the process of moving beyond stating what the government intends to do, to how it intends to do this (management) by summarizing information such as the per cent of population, harvest, recreation days and habitat on a regional basis, and by identifying regional problems and strategies. Both documents should help answer some of those persistent questions.

Paul Paetkau
Habitat Protection Branch
Fish and Wildlife Division
Department of Energy and
Natural Resources

British Columbia

"Something for the Future"

British Columbia's Habitat Conservation Fund

"Something for the future," an approving visitor to one of British Columbia's wildlife enhancement projects wrote in the register. The remark was aptly applied to the project, a multi-faceted wild sheep range enhancement and preservation program. Just as aptly, the description fits the province's recently established Habitat Conservation Fund, the source of support for much of this and many other similar projects in British Columbia.

The Habitat Conservation Fund was set up in 1981 to acquire and enhance habitat for wildlife throughout British Columbia. In the phrase attached to it in Ministry pamphlets, the Fund represents "An opportunity for wildlife." It is also an opportunity for wildlife managers, an instrument helping them move from management by regulation of the human activities affecting wildlife, to positive manipulation of habitat for the maintenance and enhancement of wildlife. This is a radical departure from the past situation in British Columbia where, despite the fact that over 90% of the province is still owned by the Crown, the constant — and justified — lament of wildlife managers has been that they had little control over wildlife habitat.

Growing cooperation with the Ministry of Forests, other resource agencies and private industry is beginning to give the Fish and Wildlife Branch a greater voice in the management of land and water (see "The Burning Issue" C.W.A., June 1982). And certainly on a broad scale, the welfare of British Columbia's wildlife will always depend on accommodation and consideration from other users of the basic land, forest and water resources. But the Habitat Conservation Fund is providing opportunities to deal with key, and sometimes crucial, elements of wildlife maintenance which, neglected, could nullify the usefulness of any general cooperative programmes.

The Habitat Conservation Fund was originally set up to operate through two working accounts, in keeping with its dual basic functions, the Acquisition Account and the Enhancement Account. In turn, the accounts reflect the two main sources of revenue for the Fund. The Acquisition Account funds the purchase of key or special habitat areas, and may also be used to lease land or acquire easements. The account has been supported by grants from the Crown Land Fund, a special fund which has been a government depository for the proceeds from sale and lease of public lands. Interest from the Crown Land Fund has been available for retrieval of land judged desirable for public use. Grants to the Habitat Conservation Fund in the first year of its operation enabled purchase of three properties totalling about 590 hectares. The largest, a full square mile in the Skull Mountain area north of Kamloops, holds key mule deer winter range and supports a variety of birds and small mammals (possibly including the yellow badger, a threatened species in British Columbia). Initially this purchase serves preservation, but the habitat will be enhanced in future years.

The smallest parcel acquired in this first use of the Acquisition Account, 86 ha. fronting the Stellako River, was also purchased to preserve a desirable piece of natural habitat and its amenities. The Stellako River, only 13 km long, provides a superior sport fishery for rainbow trout, Dolly Varden char and whitefish, and holds important spawning grounds for sockeye and chinook salmon and kokanee. Some years ago the river was the centre of controversy in one of British Columbia's first high profile conservation issues, when log drives were alleged to be ruining the fisheries. The modest 86 hectare acquisition complemented an earlier purchase by a private group, the National Second Century Fund of B.C., who leased their holding to the Ministry of Environment for one dollar, and another 200 hectares of Crown Land transferred to the Environment Ministry from the Ministry of Lands, Parks and Housing. The total holding resulting from this combination of tenures gives the Ministry of Environment control over the greatest part of the land immediately adjoining the river, ensuring that stream and fishery values and the recreation they support will be protected. "Something for the future," indeed.

The third of these initial first purchases, 246 ha. in the Okanagan, a property known as Antler's Saddle, is heavily used by wintering mule deer. That alone would have justified the purchase as a protective measure, but it was actually preliminary to plans for an enhancement program designed to hold deer in the area, reducing their tendency to become a problem in nearby orchards and a hazard on busy Highway 97.

A subsequent fourth acquisition involved less than one hectare yet was crucial to restoration of a renowned kokanee sport fishery in Kootenay Lake. Another property acquisition being negotiated as this was written would raise the total number of properties acquired to five, covering 700 ha. and costing over one million dollars in total.

More widespread use of enhancement techniques like this lake aeration project has been made possible with the advent of the B.C. Habitat Conservation Fund

Future funding for the Acquisition Account is in some doubt at present due to the transfer last year of the Crown Land Fund, along with many special government funds, into government consolidated revenue, a move to help offset the loss of tax revenues as the recession hit British Columbia's resource-based economy. The Habitat Conservation Fund itself was spared, underlining the unique, protected status of the Fund. In August, 1982, the Habitat Conservation Fund received full legislative protection in a section of the new B.C. Wildlife Act clearly defining it as a special purpose fund, in which money "shall not lapse," and which may earn and retain interest. The Act provides for money to be paid directly into the Fund and effectively protects it from plundering by other agencies or raiding by a future Treasury Board less committed to wildlife conservation.

Under the Act, money for the fund comes from "...surcharges collected on licences or applications for licences issued under this Act ...and...money acquired by gift, donation and bequest or by disposition of land acquired for the purposes of the fund." The main sources of revenue therefore are the hunters and sports fishermen who buy provincial licences, with lesser amounts contributed by trappers and guides. All of these licence buyers contribute $3 in surcharge on each licence they purchase. Their various organizations have been very supportive of the Fund.

Imposed in October, 1981, the surcharge yielded only $141,593 in the fiscal year ended March 31, 1982, but an interest-free loan of $711,802 from the government, since repaid, enabled an initial 25 habitat projects to be undertaken and completed that same year. A

further advance of $750,000 in 1982-83 made it possible to begin new projects on April 1st rather than waiting for the inflow of surcharge revenue, which, by the end of fiscal 1982-83, amounted to nearly $1.4 million.

The Habitat Conservation Fund also accepts donations and bequests from private citizens, a source of revenue that could build to significant proportions as time goes on and the work being done becomes better known. A modest promotional program is being carried on to make the Fund better known, and also to report back to the people currently providing its major support. Displays, brochures, magazine articles and information kits are being utilized, and a mini-report has been inserted in some 51,000 hunter and angler survey mailings to communicate news of the Fund directly to sportsmen.

Donations and surcharge revenue are deposited in the Enhancement Account, to be used for the improvement or restoration of important habitat areas. In the past two years, almost $1.5 million has been spent on 35 different habitat improvement projects, located in every region of the province.

Consistent with the great diversity of species found in British Columbia, a wide variety of enhancement techniques is being used, too many to describe in detail. In summary, aquatic habitats for fish are being enhanced by:

- providing artificial spawning channels or placing clean spawning gravels in natural streams or lakes.
- stream cleanup to increase juvenile rearing areas and improve access for adult migration.
- construction of fishways and fish ladders.
- planting streamside vegetation.
- installing lake aeration mechanisms to promote overwinter survival of fish.
- chemical removal of coarse fish from selected lakes and restocking with sports fish.

Wildlife habitat is being enhanced by techniques such as:

- prescribed fire, mechanical thinning of overstory and deadfall, grass seeding, fertilization and propagation of preferred browse species to rejuvenate winter range for wild ungulates.
- development of wetlands by installation of water control facilities, dyking, creation of islands and shallow water bodies, maintenance of short grass feeding pastures, cultivation of transplanted marsh vegetation, and provision of nesting sites to benefit upland gamebirds and waterfowl.

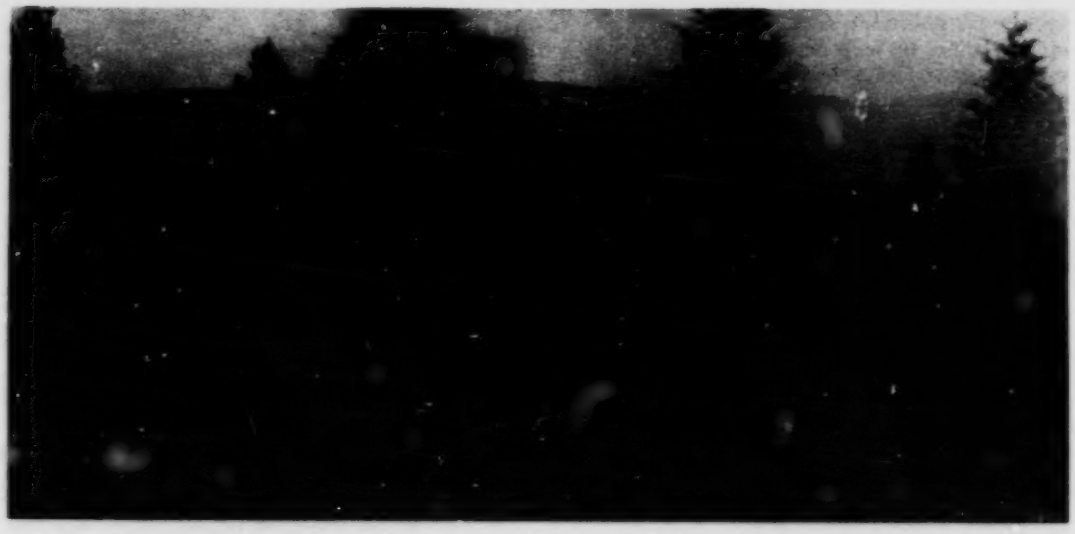
Virtually all of the enhancement projects are intensive in nature; in an area as large as British Columbia it is impractical to think in terms of applying enhancement techniques to every element of habitat, nor would it make sense economically to do so. The Habitat Conservation Fund is supplying the wherewithal and the opportunity for fish and wildlife managers to apply their science at key and crucial points; to rejuvenate winter ranges for ungulates, clean up spawning grounds for fish, provide nesting sites for waterfowl, etc. These are opportunities that seldom could be realized before.

As might be expected, many of the enhancement projects have been initiated from within the Fish and Wildlife Branch, which administers the Fund. Some are proposals that regional managers and biologists have had on the shelf, waiting for funding, for several years. However, not all the activity has been generated internally; the public has been encouraged to suggest acquisition and enhancement projects, and has in fact proposed some. All of the proposals put forward, whatever the source, are examined for their technical feasibility by the Ministry's specialists, but they are also screened by representatives of the general public. A ten member Public Advisory Board, chaired by Dr. Ian McTaggart-Cowan, keeps tabs on operation of the Fund and recommends worthwhile projects for the approval of the

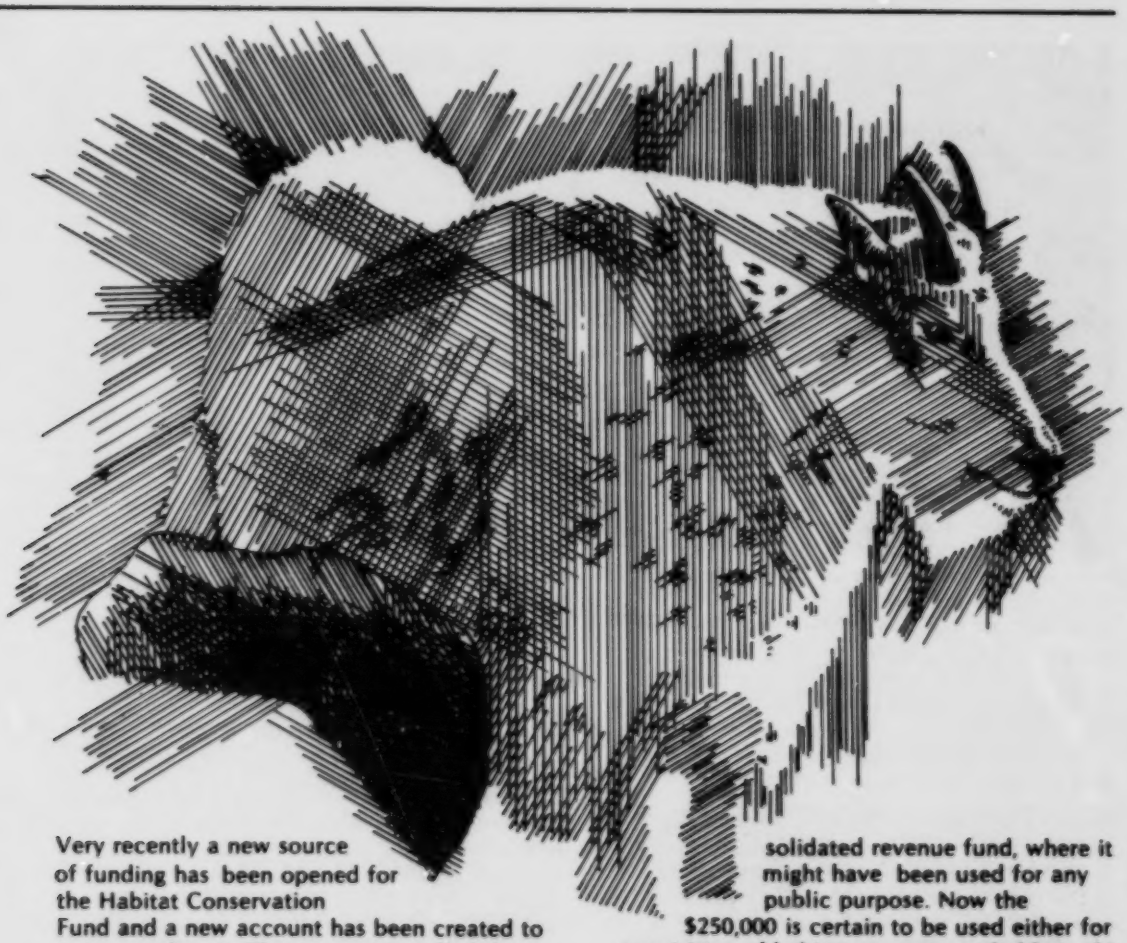
Minister of Environment. Board members, who include hunters, anglers, naturalists and scientists, have met seven times in the last two years in various parts of the province. Frequently their meetings include field trips to examine projects and proposals at first hand. Often representatives of local conservation groups are invited to accompany them.

This year another $960,000 has been allocated from the Fund for enhancement projects. The twenty-seven new projects being launched include further stream clearance work, more prescribed burning and tree thinning to improve forage for elk, deer, moose and mountain sheep; projects to reintroduce Roosevelt elk and mountain goats to areas they formerly occupied; further coarse fish eradication and lake aeration projects; improvement of grasslands for California bighorn sheep; planting of forage shrubs; placing nest boxes for waterfowl, bluebirds and other cavity-nesters. The most novel project stems from a program to re-establish the burrowing owl in suitable habitat. It involves building burrows artificially — a job once performed naturally by the now rare yellow badger.

In addition to supporting new projects, this year about one-third of the 1983-84 allotted funds will be used to continue projects begun in the first two years of the Fund's operation. Here again the Fund presents an advantage for wildlife managers over conventional financing, by virtually guaranteeing the continuity of support for interlocking projects, and programs that can be accomplished only over a period of several years. On the Junction Wildlife Management Area, for example, the California bighorn sheep habitat referred to in the opening paragraph, enhancement plans include prescribed burning of the range in some areas to improve grassland conditions and reduce conifer encroachment; some planting of browse species, and protection of critical areas by fencing, which will also be needed to control cattle used for preconditioning some of the grazing. In addition, watering areas are being developed to help distribute the livestock and benefit wildlife. With the existence of the Habitat Conservation Fund the work can be designed to follow in logical sequence from year to year, with virtual assurance that money will be available to support it.



Prescribed fire is becoming one of the most common enhancement tools for the rejuvenation of ungulate ranges in B.C.



Very recently a new source of funding has been opened for the Habitat Conservation Fund and a new account has been created to accommodate it. The account is called the "Compensation Donations Account." It has been set up to receive donations from corporations or individuals who have agreed to compensate the Province for the impact of their developments on British Columbia's fish and wildlife resources. In April this year, the Copper Division of Cominco Limited presented a cheque for $250,000, compensation for the loss of three lakes to be drained in mining the Highland Valley 'Lake Zone' copper deposit. Until now the money would have been absorbed into the government consolidated revenue fund, where it might have been used for any public purpose. Now the $250,000 is certain to be used either for acquisition of habitat or, more probably in this particular instance, for habitat enhancement near the site of the mining development. So once again the Habitat Conservation Fund has created a new opportunity for wildlife, and for wildlife management in British Columbia. For the present the Fund has facilitated many beginnings; for the future it promises to have an increasingly important place in the protection, management and improvement of our key wildlife areas.

Geoff Warden
Fish and Wildlife Branch
Ministry of Environment

Manitoba

Meals on Wheels for Deer

The bur oak and aspen surrounding the meadow are draped in hoar frost, remnants of the February night. In the cold, grey dawn the deer come like shadows, silently dark against the snow. They stop at the edge of the meadow, looking this way and that through wisps of vapor from their nostrils. A few cautious steps brings them to a wooden structure resembling a small cattle feeder. Among frequent glances over their shoulders, they nibble at the pelleted deer ration in the manger of the feeder. Thus, one of the oldest forms of game management is applied to white-tailed deer in Manitoba.

Harsh winters are a fact of life in Manitoba. Each creature living in this climate has its own way of coping. Humans bundle up in layers of clothing when outside and turn up their furnaces when indoors. Many birds migrate to warmer lands each winter. Some humans have taken the cue from their feathered friends and follow them south. Most animals that live in Manitoba, however, must adapt to the rigors of winter in order to survive. Included in this long list of hardy creatures is the white-tailed deer. Considering that white-tails only immigrated to this province about 90 years ago, they have adapted well to the harsh climate.

White-tailed deer are the most studied big game animal in North America, but it is only recently that deer managers in northern parts of the range have begun to understand how deer cope with the stress of winter. Here in Manitoba, white-tails are on the northern fringe of their range but much of what we have read and learned about deer came from the central and southern United States. During the last decade, researchers in the snowbelt states and their Canadian colleagues have uncovered much about the winter ecology of the white-tail that raises doubts about conventional techniques for managing deer in winter.

Hibernating animals store fat during the fall and live on this energy reserve during their winter sleep. To varying degrees, non-hibernating animals, such as deer, undergo the same cycle. The metabolism (body processes) of deer is highest in summer and autumn when nutritious food is abundant. Wild herbaceous plants and farm crops such as alfalfa, clover, fall rye, cereal grain, and oil seeds provide food for deer in fall. From these foods, fat, proteins and minerals are stored in preparation for winter.

Deer deaths in winter are most often related to poor weather and inadequate food supplies in fall and early spring. During winters when snow is deep, deer normally must rely on buds and twigs of trees and shrubs; this food source is called "browse." Due to the low nutrient value of much available natural browse, deer may expend more energy in searching for this food than they obtain when the material is digested. Therefore, they often must rely on fat reserves that were established in the previous fall. If the quantity and quality of food was good in the fall, chances for winter survival are enhanced. Spring is also a critical time for deer. They need good food to recover from the rigors of winter; in addition, pregnant does must prepare for the birth and nurture of their fawns. Prolonged snow cover and harsh storms in March and April can have a devastating effect on deer that are already weakened.

A major factor in winterkill of deer in Manitoba is habitat loss. Protection from the elements and browse supplied by trees and shrubs is often critical. Unfortunately, trees and shrubs are being replaced by cultivated farmland at the rate of 64,000 hectares annually. Remaining bushland is usually used for livestock pasture. Many wild plants important to deer are also eaten by cattle, leaving little food in reserve for deer to prepare for winter or to refuel in spring. As a result, deer in agricultural Manitoba have had to adopt a new life-style. They rely on remnants of bush for shelter and use cereal grains and domestic forage for much of their food. Even during mild winters, deer feed on unprotected hay bales and grain piles, resulting in a sharp increase in the number of deer damage complaints from farmers.

Pelleted deer ration in bags on feeding station in Manitoba

Severe winter conditions, combined with the loss and deterioration of habitat and heavy hunting were the chief causes of a major reduction of the provincial deer herd during the late 1960's and early 1970's. The decline in populations became so serious that after the harsh winter of 1973/74, deer hunting was prohibited for three years. That crystallized the need for innovative means to help deer cope with winter.

About that time, long term deer feeding research in Michigan and northern Minnesota revealed new information about white-tails in winter. Those studies revealed that by feeding deer a commercially produced, high-energy ration to supplement their natural diet, it was possible to help these animals cope with harsh winter weather and to increase fawn production. Conversely, some of the traditional methods of dealing with starving deer, such as cutting and feeding browse or providing hay and grain of questionable quality, were found to be ineffective. Apparently, the energy provided by these foods is insufficient to meet the demands of deer under stress of severe weather. A sudden switch from a natural to a feed-grain diet occasionally caused stomach disorders in deer when their digestive systems could not adjust to the new food.

In the late 1970's, wildlife managers working closely with conservation officers followed up on this research by conducting deer feeding studies under field situations in southern Manitoba. These projects were used to develop the techniques of feeding deer using supplemental rations as a practical management tool.

The Manitoba deer management program applies deer feeding in two situations: to reduce damage to farm forage (usually hay bales) and to supplement natural food supplies of deer in small Wildlife Management Areas or other key habitats in Agro-Manitoba. Livestock feed companies have developed a pelleted deer ration according to a strict nutritional formula prepared by animal nutritionists. These rations are transported to the field in 40 kilogram bags by pick-up truck and trailers and placed in small scale livestock-type self-feeders having a capacity of about one tonne.

Where deer are causing damage to farm forage, they are lured to a self-feeder placed in their bedding area. This is done by sprinkling bloodmeal, a packing house by-product, on the bale stack to scare deer away. At the same time, the feeder and surrounding area are "baited" with good quality alfalfa hay to

introduce deer to the pelletized ration. The result — deer remain in their bedding area and feed on the deer ration and cease causing damage to forage stacks. The principle is not unlike that of using lure crops to prevent waterfowl damage to cereal grain crops.

Deer that are fed on small Wildlife Management Areas or other pieces of habitat on Crown or private land have a lower rate of winterkill and better reproduction (increased numbers of fawns and fewer deaths of newborn fawns). These rations replace food covered by deep snow and compensate for food scarcity caused by livestock grazing or mature habitat where trees and shrubs have grown out of reach. Deer that have a good source of food nearby are less likely to cause problems at nearby farmsteads.

Pelleted deer rations cost about $200 per tonne; at that price it costs $20.00 to overwinter one deer (based on a consumption rate of one kilogram of ration per deer per day for 100 days). Only when we analyze the question of supply and demand for deer can we judge whether this expense is warranted to simply produce more deer. However, it is economically feasible to feed deer to prevent damage to stored forage, when compared to paying farmers compensation for damage. It is a positive program that is well received by Manitoba farmers.

The concept of an annual feeding program is out-of-step with conventional wildlife management in North America. European gamekeepers have fed wild deer and other wildlife species for decades but on this continent many wildlife managers still feel uneasy about the practice. There are a host of reasons given for condemning artificial feeding programs and many experts predict dire consequences. However, farmers and grain elevator agents in Manitoba have successfully helped large numbers of deer survive through severe winters by feeding the animals grain, good quality forage and screening wastes obtained from cleaning grain. The deer were saved because feeding started early in winter and continued up to snow-melt.

Some wildlife managers may have reservations about feeding white-tails, but farmers, sportsment and the public are enthusiastic about the program. Farmers have been critical of situations when potential farmlands owned by the government have been designated as Wildlife Management Areas to maintain deer habitat and the deer kept in these areas have ended up in farmyards looking for food in winter. On the other hand, the public has also criticized government officials when no effort was made to save deer in bad winters.

It is unrealistic to expect that all deer in the 180,000 square kilometres of deer range in Manitoba can be helped in winter. But it may be feasible to nourish small herds in key areas of southern Manitoba so that prime breeding stock can produce a healthy crop of fawns despite winter conditions. In the words of respected Michigan deer biologists Louis Verme and John Ozoga: "Traditional principle aside, perhaps biologists should stop viewing artificial feeding as professional hearsay and realize that when properly done it can serve as a valuable tool in the current state of the art."

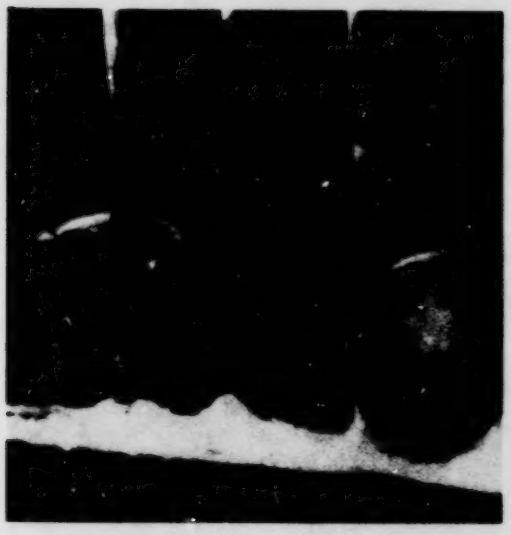
In spite of the best efforts of government and wildlife groups, deer habitat will continue to disappear in southern Manitoba for some time to come. Our only hope of maintaining substantial numbers of deer in this intensively farmed area is to save remnant pieces of habitat wherever possible and provide deer with the best source of food energy we can afford. A carefully designed deer feeding program may be the only feasible method of providing that food energy.

Herb Goulden
Wildlife Branch
Department of Natural Resources

Manitoba

Manitoba's Detention Centre for Polar Bears

As the northern lights dust the town of Churchill with a tranquil aura, a mother polar bear and two cubs gently plod their way through freshly fallen snow toward the town. It is early winter, the ice has yet to form on the Bay and the bears are hungry. Driven from Cape Churchill by the large male bears, she has come close enough to the town to smell the presence of people, civilization and food. Although she senses danger, the tempting possibility of food is too much to resist and under cover of darkness, the bears find their way to the outskirts of the town.



Bears in Detention Centre

Suddenly one of the cubs lets out a yowl. And, as quickly as his mother can investigate, two or three doors have already opened to see what's going on. The cub has stepped on a sheet of plyboard through which nails have been driven upward: a common defence and alarm device in Churchill. A resident quickly dials the Polar Bear Alert number and within minutes, specially trained Resource Officers, in a truck customized to meet the needs of the program are on their way to the site. By the time they arrive, the bears appear to have left the area. The Officers proceed to search the immediate vicinity, probing the darkness with the truck's searchlights. With luck, the bears will stumble on one of the live-traps in the area; the sow does. She is securely captured in one of the large culvert traps, mounted on a trailer. The cubs are close by but the Officers are reluctant to tranquilize them during darkness in case they lose them; they will wait until dawn. At daybreak, the bears are shot with the tranquilizing drugs; one at a time in case the bears make a run for it. All goes well and within half an hour, both cubs are safely drugged and loaded in the back of the truck. Next, the live-trap containing mother is hitched to the truck and the bears are on their way to polar bear jail. The detention centre is large and the truck can drive right to the cages. The cubs are unloaded first and placed in a large cage. Once they awaken from the drug, the live-trap with their mother will be backed against the cage. Both doors will be opened and mother and cubs will be reunited, but now safely confined for their own benefit and also the personal safety of Churchill's residents. Sentence: Until Hudson Bay freezes over!

The idea of a detention centre for Manitoba's polar bears was developed in 1976. It was one of the recommendations on polar bear management made in a formal report to the Department of Natural Resources (then the Department of Mines, Resources and Transportation Services) by a local citizens' advisory committee from Churchill. The committee was established a year earlier as part of a new program known as Community Wildlife Management which was centered in Churchill. One of the major objectives of the program was to involve local residents in the decision making process, thus capitalizing on the conventional wisdom of the people facing particular wildlife problems and hopefully bringing forth more acceptable and pragmatic solutions than might otherwise be found within the traditional bureaucratic decision-making process. The cost of the project is shared between the Federal government and the government of Manitoba.

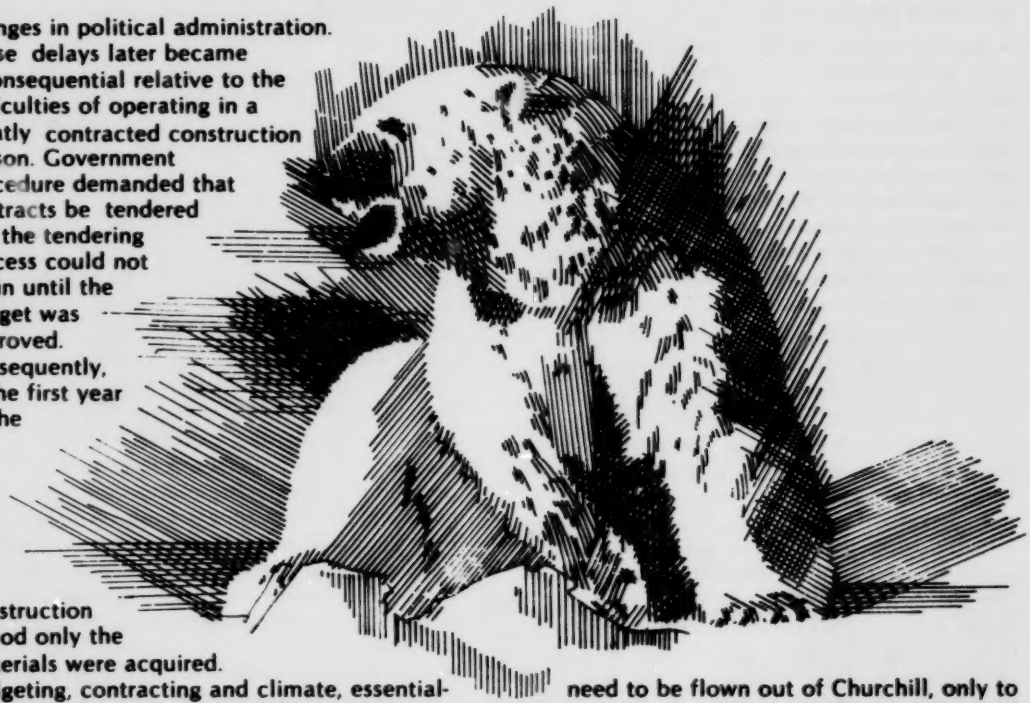
The concept of the detention centre is remarkably simple. Churchill is located in the natural fall staging area of Manitoba's polar bear population. Here, the polar bears congregate each fall, waiting for the Hudson Bay ice, whereupon they will leave the land to hunt seals throughout the winter. Fortunately, for the residents of this town (present population is less than 1,000) the preferred staging area is located 60 km to the east at Cape Churchill. The latter area is dominated by large male bears and females; sub-adults and cubs are forced to roam further afield. Consequently, the problem bears encountered in Churchill are mostly females with cubs or young bears. Many of the adult females without cubs have taken to maternity dens for winter.

Prior to the 1970's there was a large Armed Forces Base located east of Churchill. The Base was phased out in the 1970's and many of the buildings were offered to the Province of Manitoba. A large triple quonset hut, named by the army and known to this day as D20, was selected as an ideal location for the detention centre.

Initial planning suggested that the building could not hold twelve free standing steel barred cages. However, in order to capitalize on the space available the plan was later modified to accommodate 20 cages constructed with cement blocks and barred steel doors. The plan was approved and funds were allocated in 1977, but delays in commencing construction were encountered due to

Former Armed Forces quonset hut, D20, now used as Polar Bear Detention Centre

changes in political administration. These delays later became inconsequential relative to the difficulties of operating in a greatly contracted construction season. Government procedure demanded that contracts be tendered but the tendering process could not begin until the budget was approved. Consequently, in the first year of the construction period only the materials were acquired. Budgeting, contracting and climate, essentially shorten the construction period in Churchill to three or four months of the year. Despite the difficulties, the cages were completed and operational for the 1982 polar bear season and they worked.



Whenever bears are encountered in Churchill or its vicinity, they are live-trapped and transported to the centre. Here they wait, until the ice forms on Hudson Bay when they are released.

It is not expected that many bears will spend prolonged periods in polar bear jail although it is possible that early visitors to town could be confined for several months. Most bears will only spend a few weeks in the centre and the memory will soon be forgotten when they are released to re-unite with their favoured prey, the seal of Hudson Bay.

There are many advantages to managing Manitoba's problem polar bears in this manner. Foremost among the advantages, is the fact that fewer bears will be killed. There will be financial saving as bears will no longer need to be flown out of Churchill, only to return a few days later. The town of Churchill will become safer, because the old policy of "three strikes you're out" will no longer apply to bears. The bears will be live-captured and confined on their first visit to town, whereas previously, it was on the third visit that bears were shot, except in unavoidable circumstances.

In Manitoba, the polar bear detention centre is considered to be a major advance in polar bear management. It is another step to ensure the conservation of polar bears.

Most noteworthy, is that the concept of the centre originated in Churchill in a local advisory committee. Conventional wisdom and scientific knowledge of the bears combined to produce a new solution to an old problem through contemporary wildlife management.

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Newfoundland/Labrador

The Trend towards Bio-Politics

A Newfoundland Case Study

Introduction

Wildlife management has always been a practical undertaking, both its design and its implementation dependent upon the demands of a consumptive human population. The term "wildlife management" has always been somewhat misoriented — after all we manage and exercise control only over our own demands. The influence we have on animal populations and/or the habitat they require is merely a by-product of our success or failure in that regard.

It is a tacit conclusion of such logic that, to an appreciable degree, the management of wildlife resources is an undertaking of largely socio-political and socio-economic dimensions. How much and what kind of management we as trained scientists propose may to an extent operate outside of such strictures but certainly the anatomy of its application is directly dependent upon just that milieu. As scientists we may be expected to passively ride the political roller coaster — but if our desire is really to maximize wildlife and the experiencing of it, then in Newfoundland as everywhere we must become better readers of the public mind and better registers of the politics of our profession. In short, we must expect that our role will become an even more reactive one in the future than it has been in the past, particularly in respect to resource development.

This too, is largely a product of the socio-political environment, and the increasingly important position of resource development and the environmental impact legislation developed to police such industry. We must prepare ourselves for more frequent and rapid changes in priorities as the pace of resource development accelerates, and we must develop systematic approaches to wildlife management at regional levels which, at a minimum, involve long-term planning for habitat preservation. With such a strategy in place, we must learn to use the environmental assessment legislation to legally prohibit unacceptable impacts upon wildlife, to investigate with essential outside (i.e. proponent) funding and cooperation the impacts of developments and to do so using studies of both political and scientific farsightedness.

We must remember too that any management program is only as effective as its public support is strong. Increasingly our job is to enlist public interest, criticism and support, in order to impress upon sometimes lethargic proponents the value (i.e. political necessity) of demonstrating concern for the lands they develop. We also must convince elected officials of public concern and proponent responsibility and vulnerability. We "wildlife boys" of the future must be recognized for our scientific astuteness and credibility, and we must become articulate politicians, comfortable within that profession. We must make the public, the proponent and the elected official understand that we are experts in touch with the world, showing both a sociological and biological responsibility — only then will we be listened to and sought out for advice and direction. And we should be sought out, for the problems and prospects facing wildlife are best appreciated by persons trained in that field. Often, however, we fail to show confidence in our own expertise when dealing with non-scientist audiences.

What is to follow is a discussion of a resource development which, through hard discussion and pending EIS legislation, resulted in a major wildlife study of great prominence provincially and considerable attention nationally. Its history was one of difficult decisions at many government levels, with concession only at the point of no recourse. We as wildlife managers had to muster the most support that was politically practicable at every step of the way. Further, there developed out of these hard, indeed sometimes acrimonious discussions, a cooperative effort by the proponent, Newfoundland Hydro, and the Newfoundland Wildlife Division which I believe is exemplary. The Upper Salmon caribou project served to convince Newfoundland Hydro that provincial wildlife managers were serious about environment protection and that half measures weren't good enough. It also served

to educate particularly the non-biologist members of their corporation in the environmental impact problems of this province and assisted in developing their environmental awareness. This is no small victory — Newfoundland Hydro is a frequent player in this new polito-social game. Their roster now includes several biologists whose difficult job is to protect both the environment and their employer's interest. Even more importantly, political leaders who were involved had to consider, if not accept, our advice before approval was granted. The discussion to follow involves woodland caribou and a hydro project, but the principles apply equally well to any other species and any other kind of resource development.

Project Schedule

In March 1975, Newfoundland Hydro announced that four hydroelectric developments were being considered to meet the forecast provincial energy requirements up to 1983.

The Newfoundland Wildlife Division and two outside consultants identified serious potential impacts on wildlife, especially woodland caribou *(Rangifer tarandus caribou)* as a result of the Upper Salmon project (Figure 1). As a result it was decided that an in depth study of caribou populations in that area should be carried out. This was identified in the provincial government's Order In Council and in April 1979, a cooperative study by the Newfoundland Wildlife Division and Newfoundland Hydro was initiated to provide essential baseline data on these caribou populations and to identify development impacts and suggest throughout the course of the project, appropriate mitigation measures.

Scientific Reasoning — A Political Pâté?

The area about Cold Spring Pond, Godaleich Pond and Great Burnt Lake (Figure 1) is intensively utilized by caribou from the Grey River herd (estimated population 5,000) and less so by animals from the Pot Hill and Sandy herds (estimated populations 350 and 200 respectively). Each year in June and July caribou gather in the Cold Spring Pond area in large numbers — up to 2,500 animals have been counted on a single day within that triangle of land formed by Cold Spring Pond, Godaleich Pond and Great Burnt Lake. Even more

important and of greater concern, however were the reasons for such concentration.

Herein, of course, lay the crux of our political maneuverability. Our job was to clearly articulate the following reasoning not only to superior decision makers of government but also to the proponent and the general public.

This early summer grouping of animals is termed the post-calving aggregation. Composed largely of cows and young calves, this slow moving assemblage is characteristic of caribou populations everywhere. It is believed to arise from the intense harassment by flies and/or the presence of localized and highly nutritious food sources. Also possible is that this regrouping serves to reunite small groups of animals which have become separated during the calving activity a few weeks earlier. It is likely that an interaction of all these factors underlies the post-calving assembly, but most significant in this instance, is that of tens of thousands of square kilometers of range, only the Upper Salmon area is currently used by the Grey River and some of the Sandy caribou for this purpose. Also, the Upper Salmon area is the principal route by which most Grey River and some Sandy caribou reach their summer range (Figure 1). Throughout the remainder of the year, and including the fall rutting period, smaller numbers of caribou may be found in the area. During some years a limited amount of calving takes place near Cold Spring Pond.

Thus, the Wildlife Division's concern was that if animals continued their traditional movements, they would encounter roads, transmission lines, heavy equipment operation, human predators, dykes, flooding and canals. Studies in other regions of the world have shown that these activities can, directly or indirectly, result in loss of range (through interruption of migration), increased "costs of living" (i.e. greater energy requirements) and even population declines in caribou.

In Norway, for example, a herd of wild reindeer suffered a loss of range as a result of the construction and use of highway and railroad in their winter range. Caribou in Alaska showed little inclination to cross over or under simulated pipelines strung across their migration routes; the majority of animals did not cross these structures. Other Alaskan caribou populations have deserted calving range and insect relief areas as a result of oil development activitities in Prudhoe Bay. Circumstantial evidence from both Alaska and Newfoundland suggests that roads and related disturbance may have contributed to declines in caribou populations and/or altered their distributions. Thus, in Alaska, four herds whose ranges were traversed by roads all experienced population declines. To date, however, it has not been determined how important the disruption of movements by these transportation corridors has been in each decline. Here in Newfoundland our caribou show a distribution which appears to reflect avoidance of roads and associated disturbance with some few notable exceptions.

We also emphasized that roads and other human disturbance can detrimentally affect caribou in a less direct fashion. Caribou select different habitats during the year in response to a distinct seasonal preference for certain food plants and to avoid predators, flies and heat stress. We assume that the main goal of this strategy is to maximize the amount of energy they are taking in and to minimize the amount they lose. In winter time, caribou, like many other large northern species, expend more energy than they take in with their food. This would lead to starvation except that they have evolved the capacity to deposit large amounts of fat beneath the skin and amongst and on the internal organs. By burning this energy bank they correct their energy deficit and survive through the winter period. This deposit of fat is *not* a luxury but is a basic armament of survival and without it such animals cannot survive, much less reproduce. Its deposition occurs primarily during the months of June-September when, by exercising this strategy (see above) of varied habitat use they continually feed on the most nutritious forage.

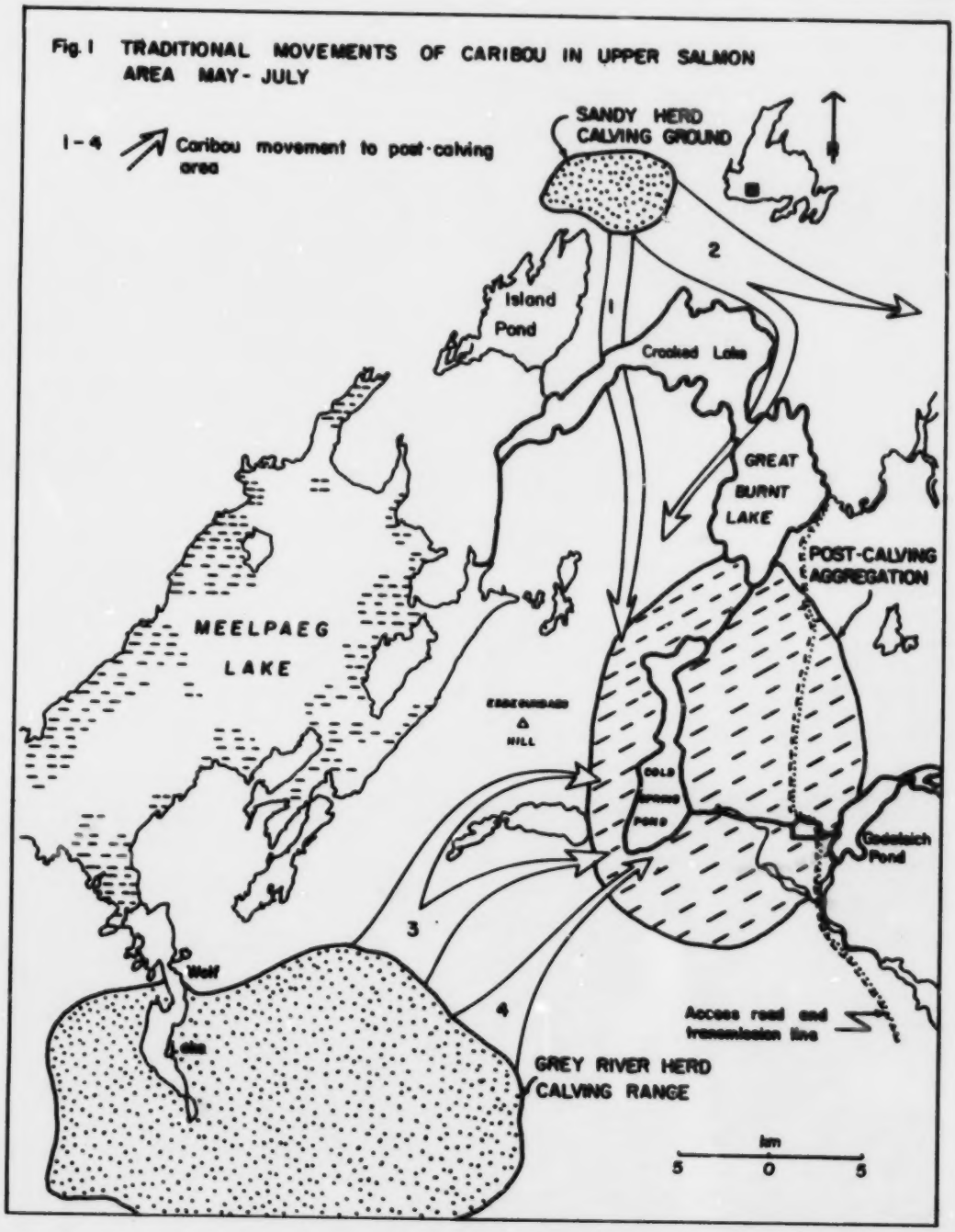
Fig. 1 TRADITIONAL MOVEMENTS OF CARIBOU IN UPPER SALMON AREA MAY - JULY
1 - 4 Caribou movement to post-calving area
SANDY HERD CALVING GROUND
Island Pond
Crooked Lake
GREAT BURNT LAKE
POST-CALVING AGGREGATION
MEELPAEG LAKE
Gladstone Pond
Wolf
Access road and transmission line
GREY RIVER HERD CALVING RANGE
km
5 0 5

The exhausted state of caribou at the end of a hard winter demonstrates the fine line between survival and death. Sometimes animals do not meet their energy requirements — Grey River caribou have starved to death during hard winters. Thus every hour of feeding is important and every hour lost from feeding is twice detrimental a) because the animals are not gaining energy if they are not taking in any food and b) because in all likelihood they are expending more energy in the harassment induced activity than they would have during undisturbed feeding. Our extension of this argument was that the repeated interruption of normal caribou resting and feeding patterns by motor vehicles, aircraft or other human activities is not so harmless as it might appear to the casual observer. We emphasized to all parties that biologists were not simply concerned that construction personnel and equipment at the Upper Salmon project might frighten caribou — but rather the impairment to a finely tuned energy budget which such reactions can represent. Such impact, if sufficient in intensity and duration, could eventually result in decreased calf survival and productivity. Additionally, we were concerned that if caribou should cease to use the Cold Spring Pond region as a post-calving area they might be forced into less favourable habitat where insect harassment is more intense and food supplies less abundant. Furthermore, if their migration onto traditional summer range was impeded, then loss of this large area could (again) seriously impair their ability to deposit sufficient fat to survive the winter period and/or reproduce.

Of utmost importance in our estimation, and most difficult to mitigate, was the problem of improved access to the caribou's previously inaccessible range. Such access results in increased hunting pressure as well as an increase in the general utilization and/or disturbance of wildlife populations in the area. Examples of such impacts come from a variety of sources including Norway and British Columbia. The caribou population in the Ootsa Lake area of that province is a case in point. In the early 1960's a herd of approximately 500 caribou thrived there. Access for hunters was provided to the herd when a dam was built and Ootsa Lake created. The hunting season was first opened in 1954. The harvest reached a peak of at least 100 animals in 1961 and the herd started to decline in 1966. Today the herd is gone.

"Biologists today must convince elected officials, development proponents and the general public of the essentialness of wildlands preservation — and they must do so with political skill"

"How much is wildlife worth and how do you define the sacredness of it?"

Caribou, we explained, because of their low reproductive rate, cannot withstand heavy hunting. What has saved them in the past was inaccessibility. But surely, it was mentioned, it is the role of wildlife biologists to regulate the harvest so that overhunting does not take place. We acknowledged this to be true but noted that poachers pay little heed to the concerns of wildlife biologists. With access comes illegal harvest — this is a fact of life. Furthermore, the road network that now stretches into Great Burnt Lake means that even after the Upper Salmon project is completed and the road is closed (a difficult *political* decision at any rate), there will be increased human contact with wildlife populations in the area. This is because in winter time, even inexperienced skidooists can now travel deep into the heart of caribou province. The potential and realized damage to wildlife, especially the large ungulates, by snow machines, is well known. Whether we like to admit it or not, caribou, like many other wildlife species, require large tracts of undisturbed land to thrive. In this case, we argued, as we must in all future instances, that habitat of pure wilderness dimension is a critical bulwark of any large scale game management policy. Infringement upon this by any resource development can often, on the whole, be far greater than the sum of its particular impacts would initially suggest.

The Grey River Caribou Study

Previous to our current research, the Wildlife Division had performed regular inventories of the caribou populations in the south-central Newfoundland region. This new hydro development, however, necessitated a more detailed investigation of these animals. Long and sometimes difficult discussions at several levels in government were to take place before the details of this could be worked out. But eventually an acceptable study design emerged and both Hydro's and the Wildlife Division's commitment to this work were legally enshrined, at least in a broad perspective, within an Order In Council.

All parties agreed that the distribution of the three herds was a foremost concern, as this would indicate when, in what numbers, and where, the animals would interact with the Upper Salmon project. Furthermore, any change in the normal distribution pattern as a result of the construction project would be discovered only if the normal patterns of range occupancy were well defined. To identify the year round distribution of these populations, over 200 caribou were outfitted with radio collars. These animals were then

followed from fixed-wing and helicopter aircraft and by ground tracking, using antennae, electronic scanners and receivers. Literally thousands of man hours have gone into this effort. The result has been an extremely fine understanding of where caribou reside at all times of the year.

Incorporated into the study design was an ongoing program of mitigation. The Newfoundland Wildlife Division, Newfoundland Hydro and the Newfoundland Department of Environment drew up guidelines for work stoppages and operating procedures designed to reduce direct caribou/project interaction. These included the moving of men and machinery in convoys, the sloping of canals and other embankments to facilitate caribou crossing of waterways and roads, the construction of organic ramps where roads crossed caribou trail systems, the issuing of guidelines to workmen that if caribou were encountered on the road that all vehicles were to cease operation and not start again until caribou had left the right-of-way, the scarifying of roads and/or their complete resurfacing with topsoil, and the prohibiting of hunting by construction personnel or other persons within the confines of the project area. The effectiveness of these measures has not been fully appraised but indications are that at least some of the measures did assist caribou in their movements.

Evidence For Impact

While studies are continuing, some preliminary evidence does suggest that changes have occurred in caribou distribution about and through the disturbance area. In 1979 for example, before the project got underway, approximately 300 animals of the Grey River herd calved within a five kilometre radius of Cold Spring Pond. Since then calving has not occurred there. Further, hundreds of caribou moved though the project area during the fall migration of 1980, with some animals walking right through the main construction camp! Many animals approaching that year detoured, as have almost all animals in the fall since. As well, in June and July 1981, only 18 of 33 (54.5%) observed caribou road-crossing attempts were successful, one (3%) was partially successful when two-thirds of the company crossed the road and one-third turned back and 14 (42.4%) were unsuccessful. Furthermore, whenever animals encountered the road, they were alert and often hesitant: they reacted most strongly to road and vehicle disturbance (10/14 = 71.4% of the recorded failures), but in other cases (2/14 = 14.3%) the road itself appeared sufficient to halt animal movement. Also, in both 1981 and 1982, up to 2,000 caribou assembled within a kilometre of the development access road but did not cross it during either year until a complete three day work stoppage was instated.

The evidence to date does not, however, indicate the project as a direct cause of caribou mortality. As well, caribou have continued through 1982 to use the Cold Spring Pond area as post-calving staging habitat, although very localized alterations in distribution may yet be deciphered. And furthermore it must be acknowledged that the above evidence is largely circumstantial and cause and effect relationships must be delineated with due caution.

Conclusions

Whether or not the Upper Salmon hydro project will have lasting impact on resident caribou populations, time and the Wildlife Division's research will tell. Our intention all along has been to use such results to better design resource developments of the future and to eliminate or reduce the impacts of such developments on the wildlife resource. However, this project has already been of tremendous importance to the environmental movement in this province. It has set provincial precedents for active proponent participation in Wildlife studies (an arrangement of great success in my estimation) and it has been of great educational value both for us as wildlife managers cradling infant EIS legislation and for the proponent wondering aloud at this new and considerable additional cost of development. But most importantly it has convinced me that our future successes as wildlife managers will depend more and more on our astuteness as active political scientists.

Today's wilderness experiences are still, to a large degree, currency of passive investment. We cherish relatively few such phenomena which exist by our active lobbying and relatively many which are due to inaccessibility and geographic positioning. However, this has begun, and will continue, to change. True wild areas and, by inescapable definition, true wildlife experiences, are becoming ever rarer in a world of shrinking dimensions. Our expanding population with its exponential hunger for the world's resources pushes inexorably towards a time of heightened confrontation — those unpalatable moments when decisions of principle are rendered in the face of ever mounting economic pressures. Unquestionably, wildlife management of the future will be political.

As a biologist today, one requires working knowledge of emotional persuasion (how do you define the sacredness of wilderness?) and the begetting and exercising of power. For wildlife management is now more than ever both a science and an art — our tiled lecture halls and all other jaded cloaks of academia may indeed invest in us the conscience of a scientist, but the art has been and will remain largely a matter of experience and inherent ability.

Wildlife management in Newfoundland is challenging us to become better biopoliticians — failure to do so will render us and the wildlife resource extravagant. Here as elsewhere, the environmental movement will play an even larger role in the future than in the past and our profession will develop a much more reactive personality. This will occur not because it is necessarily correct but because it is, simply, necessary.

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Nova Scotia

The Coyote

A New Mammal, New Challenges

For better or worse, Nova Scotia has recently acquired a new resident mammal — the eastern coyote *(Canis latrans var.)* Restricted to western North America prior to 1900, the coyote has rapidly extended its range eastward through the northeastern United States and Canada since that time.

Repeating the pattern experienced in New Brunswick in the early seventies, the Nova Scotia coyote population (as indicated by harvest records) has expanded rapidly (see Figure 1) since the first confirmed specimen was taken in Guysborough County in 1977. Now established throughout the mainland and Cape Breton Island, the population and harvest are expected to continue to increase.

The eastern coyote is basically a western coyote which has picked up significant wolf and dog characteristics through interbreeding. These give the eastern coyote a much larger body size, a darker, more variable and lower quality pelt, plus some wolf-like behavioural characteristics. The coyote, as a species, might aptly be called a "survivor." Throughout its range the coyote has proven its great adaptability, not only colonizing but thriving in a wide range of situations. Unlike the wolf or the western coyote, our eastern "hybrid" has all the qualities needed to thrive throughout the former range of the wolf in close proximity to human habitation.

The coyote is a very adaptable and opportunistic feeder, and a proficient hunter and scavenger. In addition to its staple foods, rodents and snowshoe hares, the coyote diet may also include vegetation, carrion, garbage, birds, deer and domestic livestock, as available. Potential for large litter size (2-16, average 5) and high proportion of females breeding (including yearlings), allows coyote populations to persist even under intensive exploitation and/or control efforts.

The arrival of a new wild canine predator species has important implications for Nova Scotia. (a) As a new furbearer available for harvest, the wary coyote should challenge the abilities of even the most experienced trappers. This is a mixed blessing, however, as competition by this aggressive new predator for food and territories is expected to result in reductions in populations of bobcats and red foxes. This is not good news for the trapping industry as both red fox and bobcat pelts are considerably more valuable than the poor quality fur of the eastern coyote.
(b) Inevitably its predatory feeding habits put the coyote in direct conflict with human interests and activities, expecially game and livestock production. Studies in other areas of North America have indicated that predation by coyotes may limit deer numbers in very localized areas but cannot limit whole populations. Nonetheless, when noticeable local predation does occur, as it has and will continue to do in Nova Scotia, it raises considerable concern among local sportsmen — concern which must be addressed by the agency responsible for wildlife management.

Depredation of livestock by problem coyotes has already, and will continue, to pose serious local problems for producers of sheep and to a lesser extent other livestock in Nova Scotia. This problem is common throughout the coyote's range wherever livestock operations occur and is likely to increase as the coyote population and livestock production continues to grow.

Public Attitude

Public attitude towards the newly acquired predator varies. Most people know little about the coyote population. As the population is still relatively low, sightings are not common. For the most part the general public is barely aware of its existence in Nova Scotia. Of those who are aware, attitudes of most would range from indifference to limited enthusiasm at the presence of a new wolf-like species filling the former niche of the timber wolf in our province. Few could argue the aesthetic pleasure of a coyote howl on a still, moonlit evening. Even among trappers and hunters, attitudes tend to be indifferent or positive, with the only reservation being concern for potential negative effects on other furbearer and deer populations. It is the livestock (particularly sheep) producers and agricultural authorities who are most concerned, and justifiably so, as it is for them that the coyote presents the most obvious threat for present and future operations. Increasing occurrence of sheep-killing by coyotes has resulted in individual livestock producers and agricultural organizations calling on government to take action to control coyote populations and limit predator damage.

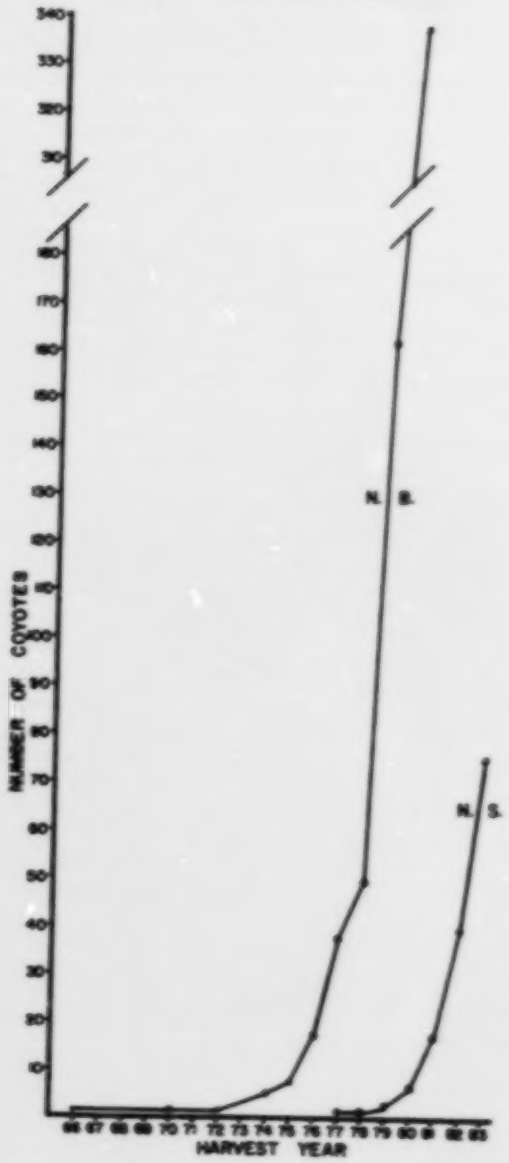


Figure 1. Coyote harvests in New Brunswick and Nova Scotia

Approaches

Short Term

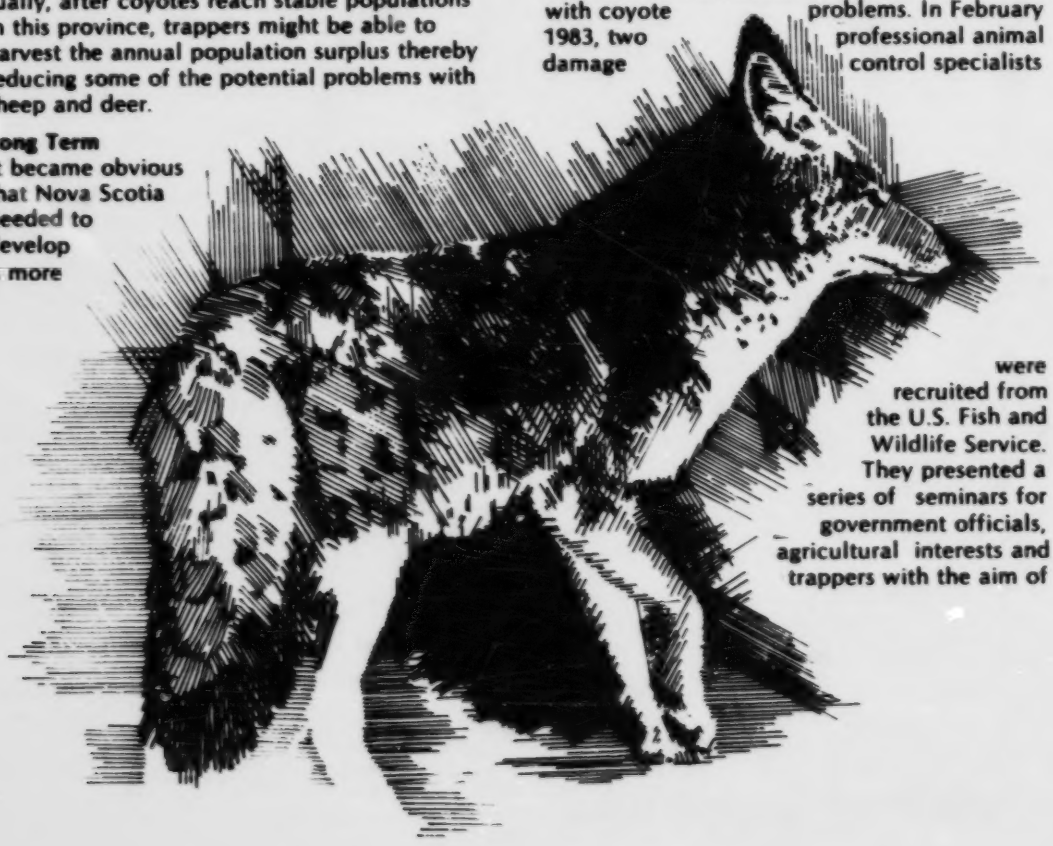
The Lands and Forests Act currently permits an owner or his agent to destroy, by appropriate means, any animal doing or about to do damage to private property (including livestock) on land owned or leased by him. With concern mounting over coyote problems, government removed the coyote from the list of protected Nova Scotia furbearers in November, 1982. This change allows anyone to destroy or possess coyotes (pelts or carcasses) at any time of year without a permit. While the coyote may be shot at any time, it is still classed as a furbearer and as such may only be trapped or snared during the regular trapping season (November to February, inclusive), except for the protection of private property.

Later, at the request of agricultural interests, a bounty of $50 per coyote was instituted (presentation of the carcass for positive identification by skull measurements is required). Past experience in Nova Scotia and elsewhere has proven this type of regulation to be ineffective in population control of predators. However, as a temporary measure, until a more effective approach can be implemented, the coyote bounty will reassure concerned livestock producers that the government is responding to their problem. In addition, the bounty should draw more public attention to this problem and may, through increased monetary incentive, stimulate competent trappers to experiment and adapt their trapping techniques and equipment to become more effective coyote trappers. Eventually, after coyotes reach stable populations in this province, trappers might be able to harvest the annual population surplus thereby reducing some of the potential problems with sheep and deer.

Long Term

It became obvious that Nova Scotia needed to develop a more comprehensive long term plan to cope with the "coyote problem." Key to this effort is the need for a better understanding of the animal and the circumstances surrounding associated problems. To this end a study of the biology of colonizing coyote populations in New Brunswick and Nova Scotia was recently completed and cooperative studies are continuing to determine more about the expanding population. This work is facilitated by the mandatory submission of carcasses required to collect the bounty.

Since, in other areas of North America, sheep-coyote and other coyote problems are certainly not new, we recognized that we could benefit greatly from the advice and technical expertise of individuals competent in dealing with coyote damage problems. In February 1983, two professional animal control specialists were recruited from the U.S. Fish and Wildlife Service. They presented a series of seminars for government officials, agricultural interests and trappers with the aim of



creating a better understanding of coyotes and coyote problems. The seminars and subsequent discussion of the problem among interested groups proved most productive and will provide a basis for developing a practical, realistic approach to the problem.

Through the learning experience thus far a number of points are now clear:

1. Coyotes and associated potential problems are here to stay.
2. Predator damage control (as opposed to large scale population control) is the only viable option for coping with problem coyotes in this province.
3. If the extent of the problem becomes such that there is sufficient damage to warrant it, predator control will be most effectively accomplished by a full-time predator control officer with the necessary skills and equipment and time to devote to the problem.
4. Information and education will be an important aspect of a continuing response to coyote problems. Further seminars and distribution of printed education materials for government agency personnel, livestock interests and trappers will facilitate better understanding and ability to cope with the problem. Livestock producers can be guided in helping themselves. Operations may be modified (where possible) to minimize damage and/or increase protection. Better fencing (including electric), repellents and other techniques may be useful in various situations. The ability of trappers to capture coyotes can be improved. Government agencies can play an important role in facilitating cooperation between trappers and landowners to provide assistance with coyote problems.
5. No one tool or approach is the "super solution" to the problem. A multi-method approach, responding to specific situations and supplemented by information and education programs, will be the most effective course of action.

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Dept. of Lands and Forests

Ontario

Wildlife Research

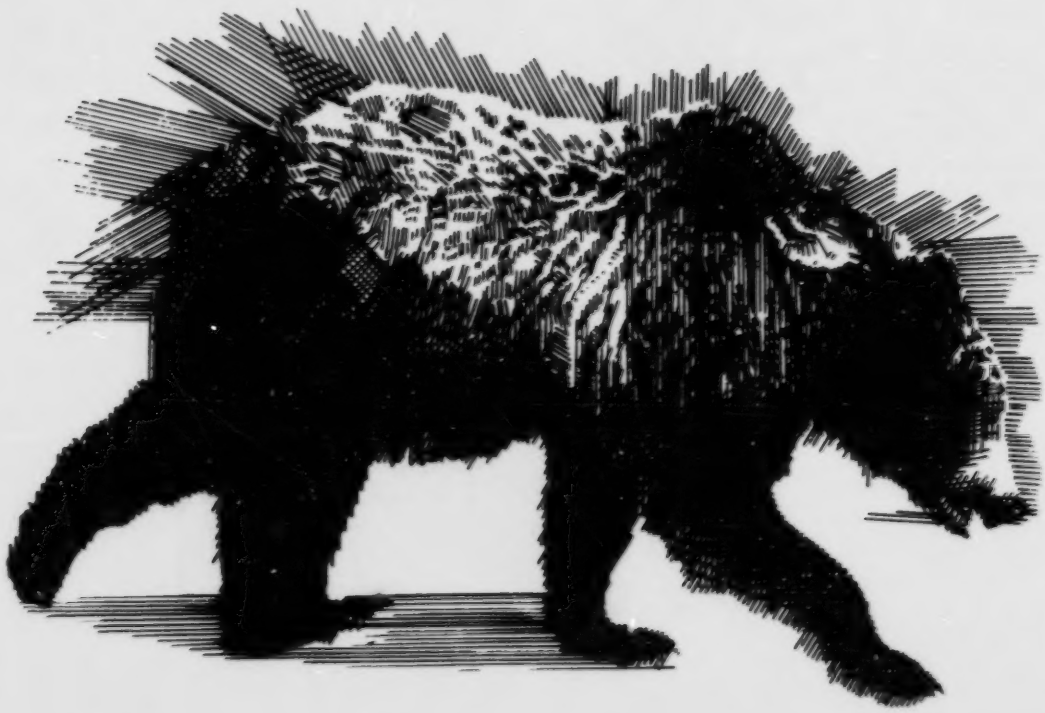
Today and Tomorrow

The goal of research is generation of new ideas, new interpretations and new information. The 1970's saw progressive restriction of research in most Canadian wildlife agencies. The major reasons were two: shrinkage of funds and staff, and a need to use skilled personnel to address urgent priorities, especially the performance and evaluation of environmental impact statements for major projects such as petroleum exploration. An underlying current was politicians' disenchantment with research in general.

A major basis for this article is my conviction that research *has*, in the past, provided useful input to the management process. An interesting exercise for you, the reader, will be to stop at this point and list those research projects which you feel have made an important contribution. Try to rank the list in order. When you have read the rest of the article, go back to your list and look at the nature of the operational parts of the research programs and make your own judgement about the truth of what I have said.

"To every complex question there is a simple answer, and it is wrong" — H. L. Mencken, 1925. Please remember that I support that statement as you read on. There are exceptions to everything I have said. For the sake of brevity, I have painted in black and white. In truth, black is an approximation of dark gray, which is a result of several parts black and a few of white, mixed with many pots of muddy gray.

Research done by a government agency must be relevant to the goals of that agency. However, much of the debate concerning basic versus applied research was wasted wind. Provided research staff are properly motivated,



today's basic work will be found to provide the foundation for tomorrow's management. Mortality analysis provides one of the best examples of management held up or misled and misdirected for decades by lack of appropriate basic understanding. After many years of fighting with life-table analysis, frustration drove the U.S. Fish and Wildlife Service to a 10-year effort to find a better way. If there had been no preceding frustration, the underlying mathematics would have been dismissed as academic and "basic." The motivation of research staff to support overall aims of the agency is, in my opinion, slandered far too often. Lack of two-way communication between research and senior management is more often the problem.

The problem of relevance, or "application," may be stated another way. Research takes time; therefore, to be ready to support management, the researcher must try to predict what will preoccupy managers' attention some years ahead. When a manager is beset by a variety of immediate problems, it will infuriate him to have the researcher proposing to look at future needs, rather than pitching in on today's brushfires. Yet, observation of the recent past suggests that, if we wait for political priority to develop about a particular topic, the subject will be almost forgotten by the time an investigation is planned, executed, analysed and reported.

Another bone of contention has been clear in the 1970's. Political priorities made a strong case that no problem should require more than three years investigation. I believe that careful tabulation of studies in wildlife biology whose results are most often used to support management programs will show that medium to long-term studies (5-15 years) are extraordinarily valuable. I fail to understand how anyone working in the Canadian climate can expect to derive predictive ability from short-term field studies. A major challenge for the next decade will be to convince senior managers and politicians that 10-year studies are genuinely cost effective.

Part of the problem in time-span derives from the fact that choice of species by wildlife management agencies is not made according to ease of conducting research on them. Big game species in particular are poor risks for 3-year studies which will provide all the answers.

Wildlife agencies need to broaden their horizons for research. It grows clearer every year that management is aimed more at people than at wildlife, yet we spend much more research effort on the behaviour of wildlife than of the people we manage. How many biologists have proposed a detailed management plan, soundly based on the welfare of the animal to be managed, only to be told "The people will never accept that." Often the biologist is aware that his antagonist has no more real (or quantitative) knowledge of public perceptions than himself, but he also knows that he is considered ignorant in that area. Public perceptions are changing, and few wildlife agencies are monitoring the directions and rates of such change. When social and economic knowledge can be integrated with ecosystem biology we may achieve really effective management.

The scale of future research projects needs careful attention. I believe that the days are long past when one biologist, with perhaps a summer student or two to help, can produce results which will really help the management process. It is a tribute to our predecessors that that is so; they were remarkably efficient at conducting such studies, and managed to deal effectively with a high proportion of the available opportunities. Their research opened new avenues, but the easy work is done. In the 1960's and 1970's, the most effective projects have involved teams of 10-20 people. A good team is a collection of specialists whose talents and knowledge complement each other. I believe that these are a major pattern for the future.

One or more experienced technicians with sound knowledge of the logistics of field operations are indispensible to a research team. A major weakness of many field investigations has been insufficient organization, often a result of leaving the scientist-in-charge responsible for everything. I do not wish to imply that scientists are poor organizers, but science has suffered when the scientist became preoccupied with details of logistics. Experienced technicians and administrative officers dedicated to making a project work are worth their weight in gold. They are the unsung heroes behind several important studies. I am fortunate to work with an administrative officer dedicated to getting the job done. I have in the past suffered through individuals who view scientists as a conniving lot, bent on subverting government regulations. The lady I work with abides by the rules, and makes sure that my staff and I do likewise, but she makes the rules work towards getting the job done, not against it. What a difference!

Given the generous rates of pay for research scientists or biologists in most Canadian jurisdictions, lack of adequate support, in terms of support staff, equipment and sometimes operating funds constitutes poor management of human resources. Most wildlife scientists on Canadian staffs today could produce more and better science if they were not spending so much time on technical and administrative tasks which ought to be done by support staff. However, I am also aware that many scientists have no training and too little experience in how to use such staff. I have little sympathy for the haughty scientist who wants all menial tasks done by "the lower ranks," but I also feel that the individual who insists on doing all the little jobs, to make sure they are done right, is making inefficient use of the salary invested in him.

Too little attention is paid to evaluation of methods and equipment; both scientists and administrators are guilty here. This broad problem surfaces in many disguises. In the rush to get the answer, scientists, urged on by their bosses, often forget to examine whether the presence of biologists biases the behaviour of the animals they are studying. During a recent study of black bears in Ontario, we came to suspect that the bait used to attract bears to trap sites may have been in sufficient quantity to enhance the survival or reproduction of the bears under study. In the same study, I saw a two-man crew underutilized for six weeks because their telemetry receiver went out of order, and had to go to the factory for repairs. After that experience, a back-up receiver looks cheap in comparison to the hole in the data, and the unproductive operations costs.

I have worked with scientists who are gadgetmen: they *must* have every new device that comes on the market. At the other end of the scale are self-professed mechanical mice, for whom equipment is baffling and instruction manuals are written in some "other" language. One challenge of the '80's will be co-adaption of wildlife scientists and computers.

It is high time we examined the possibility of inter-government cooperation on equipment development. I have found radio-telemetry to be very labour-intensive. I have dreamed of an automatic receiving system which might cover enough area to serve as the core for big-game investigations. Writing off development costs of such a system against one project puts the price too high, yet several Canadian agencies could profit from the system if it were developed. Take a 20-year look into the future — can we afford *not* to have such a utility?

I believe that the profession of research manager is maturing in Canadian wildlife agencies, and that it is past time to share perceptions on how to plan future research.

For example, various agencies have used simulation workshops to help set priorities for data collection on complex investigations. I for one would appreciate their evaluation of this tool.

By now I can visualize a lot of administrative doodle-pads adorned with cartoons of an ostrich, head deeply buried in the sand and labelled MacInnes. There are muttered imprecations of "Has he not heard of economic hard times? Does the slogan 'Do more with less' escape his comprehension?" Pull out that list of research projects you considered useful. Do short-term or long-term projects dominate the top of your list? Follow through this article and score the projects you listed against the list of paragraph subjects. Remember also that most agencies submit research results to a peer approval process: acceptance by politicians and the public will not override rigorous negative review by qualified scientists, especially since, in the modern era, there are people with scientific knowledge and abilities in public interest groups and in the media. Further, government managers, as well as the public may accept "thinly spread" research if it confirms what we already know, but let the results run counter to the conventional wisdom and we all require complete data and rigorous analysis. There is more thorough quality control on research results than on results of management programs.

The contributions of research to management 10 years from now depend on today's planning and budgeting. Where are we?

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Let The Public Do It

Wildlife biologists are often like fathers with new Christmas train sets for their kids. If the kids are lucky, they'll get their hands on the machinery around January 15, and only if Dad is not at home. I remember a moose tagging operation in which I was involved going about the same way. It was too much fun. I was damned if I was going to let the technicians get involved, even though they were every bit as capable as I of doing so. In fact, it stretched no one's imagination to conclude that, in my professional infancy, they might have been infinitely more capable of handling live *moose* than a recently graduated *mouse* physiologist.

However, none of us even remotely considered letting the public get involved in this matter, other than to provide a rented helicopter. Not only were civil servant scientists having too much fun to let anyone else get too close, but administrators would have blanched at the thought of possible liabilities. Possible liabilities, of course, have been the bottom line, and usually the terminal punctuation of many in-government thoughts about public participation.

How time changes things. We are now entering an era in which the role of the wildlife manager will be to plan, coordinate, and stimulate the work and challenges by the public. If he does not operate in this fashion, in Ontario at least, the work won't get done.

The purpose of this article is to stimulate thinking in this area, to possibly tear down some old attitudes among us old wildlife managers, and to remind ourselves that the matter of privatization of wildlife management isn't new at all. In fact, when we think about it, it seems to have been a key factor in the success of some wildlife management systems.

Some Examples of Public Participation

The trapline management system in Ontario is a key part of the Crown land fur management system, often alluded to as one of the most successful wildlife management programs, anywhere in the world. Using the concepts of Crown land traplines and exclusive trapping privileges, Jack Grew and a small band of wildlife management officers rescued fur harvest from the anarchy of overexploitation, and internecine warfare among trappers in the late 1940's and early 50's.

There were certain keys to the success of the program. A relatively elaborate system of reporting and sealing harvest stopped the extensive illicit trade. Even more important, however, were the new proprietary privileges acquired by trappers assigned to these traplines. The fur resource on the traplines was now theirs as long as they looked after it. Many trappers were not long in concluding that they could actively manage furbearers in more ways than by simply controlling their own harvest. They had to survey and assess before they harvested. They had to maintain surveillance for poaching because the job would not likely be adequately done by five Conservation Officers in 100,000 square miles. They could even do some habitat work in cooperation with the local timber company, which in turn often needed them to control beavers.

Management of fur harvest can work without this proprietorship. That is fur, harvest is still grossly controllable on private lands with only regulatory harvest controls in operation. But, all the forward-looking things the Crown land trapper can do are likely to be missing from the system. This has prompted Ontario to attempt to establish private land trapping areas or traplines.

One outstanding example in big game management that comes to mind is a group which was formed over a decade ago to manage deer habitat. Perhaps this was a key factor in the formulation of SCOBA, the South-Central Ontario Big Game Association. The group formed around a cause. Those interested in that cause came together, discovered mutual outdoor interests, and became a highly successful functioning group. Their fascination with four-wheel drive trucks, chainsaw fuel-oil mixtures, power winches, and the joys of getting stuck at -40° provided layer upon layer of camraderie which cemented the bunch together.

SCOBA members seem to enjoy both their mission (producing deer) and the means by which they go about it. They are undoubtedly the proprietors of 'their' sector of forest. God help anyone who would seek in any way to negate the effects of what they have done!

A Change of Thinking Necessary

The orientation and sense of mission of SCOBA is quite unusual in Ontario, although SCOBA has been in existence and has served as an example for quite some time. While a multitude of fish and game clubs exist, their general purpose always seems to be to influence government in the way *it* does things, not necessarily (or even usually) to undertake management themselves.

SCOBA happened. The challenge now is to make it happen again.

There is now a general dictum within the Ontario Government to 'privatize' as much as possible. Originally, civil servants reacted by sending more things out to consultants, and while this is 'privatization' in a sense, it really doesn't take matters off the government plate. Consultants tend to do their jobs very well; a general perception is that they often leave with one problem, analyze it, and come back with ten more, often highly coloured by the opinions of *our* staff.

I think it's fair to say that the Ontario Government would like everything off its back that doesn't have to be there. If at all possible, the user should pay for the management of resources he or she enjoys, and that can't happen when payments of various kinds are passing into a consolidated, government revenue.

In times of general financial stress, consolidated funds tend to get gobbled up by essential services. At a time when our spending power (and actual dollar) is declining, our wildlife management problems and programs are becoming more complex. We may be faced with more people demanding increased hunting and trapping opportunities when we can least afford to mount traditional controls.

Finally, Wildlife research is often the first to suffer because it seems esoteric, even to some wildlife managers. However, people who conduct successful research will be the only ones to provide knowledge when managers desperately need it 10 years down the road.

The challenge, then, is to get the job done, somehow, by someone who will see some sort of benefit and/or satisfaction in doing the job. From experience I can say, "Changing a 'Doer' into a 'Facilitator' or 'Scrounger' ain't easy!"

Some Forms of Public Participation

1. Involvement of Interest Groups

The interest groups that have developed in Ontario are primarily user groups. A common characteristic that they all have is their almost continuous quest for explanation of what we have done, are doing, or are going to do. These groups tend to be of relatively large size and, until recently, did most of their 'participating' in the form of giving advice or participating in decision-making.

These groups have seldom ventured into active management programs, to date, with the exception of hunter training. As with many groups of adults, it was common to find a few compulsive, tireless workers in individual clubs, while the remainder seemed intent on fulfilling personal social objectives. This common observation tended to result in much cynicism among wildlife managers about the potential for successful programs with these groups.

We are beginning to suspect, however, that the key factor may be the amount and kind of challenge. These groups were largely responsible for developing and contributing hunter instructors, when it was demanded that hunter qualification be compulsory and instruction be provided in the private sector.

These groups have also demonstrated themselves to be eminently capable of producing and distributing high quality educational materials, with which they may forward their interests. They are just beginning to gain the confidence and capability necessary to move with these materials beyond their own internal programs.

Most recently, anglers have been challenged to undertake certain fisheries management tasks, with funds generated from private sources. The response has been very gratifying.

Groups formed around actual wildlife management tasks seem to operate quite differently. Few wildlife managers consider it sinful or demeaning to enlist bird-banding or bird-watching groups. I have already referred to the useful work of a deer habitat group.

In Ontario, these groups tend to ask technical questions. There is little confusion about their objectives. We tend to go to them for help more than they come to us. They are fulfilling their personal objectives by active participation in what is often a highly useful wildlife management program.

Commercial users have become the most successful of all user groups in self-education and self-defence by use of publicity. The Ontario Trappers' Association is almost unique in its people and financial resources, and in the resources it has marshalled to counter criticism of trapping wildlife. It has also accepted the challenge to publish many of the materials formerly published by the Ministry of Natural Resources for its wildlife management programs.

2. Involvement of Private Industry

Ducks Unlimited is unique in that it is an 'industry' formed by sportsmen to undertake management of habitat of a migratory resource. Its operations are well-known throughout Canada and do not bear repetition here. However, it is interesting to keep D.U. in mind when stimulating the private sector to undertake other kinds of wildlife management.

Other examples of private industries that get involved in wildlife management are those involved in some way with management of other natural resources, and which undertake wildlife management to mitigate effects of resource extraction or to capitalize on the wildlife resource as well as other resources.

Some forest companies do a good job of managing wildlife, and this will probably come to light in the 1984 conference on forest management and wildlife.

Conservation Authorities, which are charged primarily with water conservation in Ontario, also become involved with aspects of wildlife management due to their control over extensive floodplains.

Another type of industry is the consulting industry, the function of which is alluded to above. This industry has potential for greater use as other industries move into wildlife management programs and enlist their expertise.

3. Involvement of the Landowner
One of our large problems is that the landowners of Ontario are not truly involved in wildlife management. The exceptions are rare, but the message we get from them, and from aborted extension efforts in neighbouring parts of North America, is that wildlife management on private lands will not be done without sufficient economic return to the landowner.

The people who are the rare exceptions are either zealous conservationists or individuals or groups who have found a way of "making it pay."

One private forest holding in Central Ontario not only produces forest products, but also a full spectrum of year-round recreational activities. It is probably one of the best examples of a revier outside of middle Europe.

We feel that this aspect could be more fully explored and developed. The major question is whether the present free access by residents to fish and hunt on Crown and certain railway lands should be restricted by a private agency, so that it could obtain financial resources to manage and reward its involvement.

The Challenge

Wildlife management is interesting to a lot of people — not just biologists and resource technicians. We have already seen that people will become involved directly, if they are encouraged and supported over that uncertain period.

The objectives should be to expand management and research systems if at all possible, by privatization.

The predominant roles of the government manager become planning, coordinating, and assessing the effects of programs on those creatures, great and small, under his then indirect care.

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Children and the Future of Wildlife Conservation

Wildlife managers can be relieved of many frustrations and difficulties if they are able to work with a well-informed public. Some sectors of the public actively oppose hunting and trapping programs. In many cases, the concerns which generate this opposition are not founded on facts. In many others, the public has no knowledge of, or is apathetic about, such serious problems as habitat deterioration or loss and single-purpose use of land. Education programs that would create a well-informed public would help government to address some of these problems.

Ideally, every member of the public should be educated about wildlife. But limited money and staff make it necessary to focus on a more specific audience. We must ask, which portion of the public would be most receptive to a program and how can we get the most out of our efforts?

Children in elementary school, and particularly those in the 8-to-12-year-old (grades 4 to 6) group, are ideally suited to educational programs. There are several reasons for this:

1. Such children are still building their attitudes and values. Values-education programs, such as are now operating successfully in Ontario, are directed at the elementary level for this reason.
2. Children of this age are greatly interested in living things, and are thus receptive to lessons about them. Wildlife does not need to be "sold" to this audience as it would to adults.
3. School children are accustomed to learning and enjoy it. They absorb information on wildlife biology like dry sponges.
4. Unlike adults, children can use school time rather than leisure time to learn about wildlife. If we present the material in ways that meet the needs of educators, we can ensure that it becomes part of the school curriculum.
5. Within the next two decades, such threats to wildlife as acid precipitation, intensive agriculture and urban development will reach critical proportions in some areas. The school children we educate today will make up the public that votes on these issues tomorrow.
6. If we can teach the future users of wildlife and the land to use these resources wisely, we will have done a large part of our job.

School children are not learning enough about wildlife to become the conservationists who will be needed tomorrow. Most of Ontario's children live in large urban centres, where the day-to-day, direct contact with wildlife that their rural forebearers enjoyed is lacking. Technology and computers set against landscapes of glass and concrete make up their world.

Within this world, television is one of the most powerful influences on children. It is a principal diversion and a major source of information and, to teachers, an important teaching aid. Yet much of television's wildlife programming is inaccurate or misleading, frequently implying that hunting and trapping are bad and that wildlife is best left alone. Too little factual information about the social, economic and cultural use of wildlife conservation is conveyed.

Another result of television is the anthropocentric representation of animals as puppet or cartoon characters that behave like people. If children remain unaware of the true nature of wildlife species, they cannot be expected to make realistic evaluations of activities that involve these species. For these reasons, effective classroom education is needed.

To be effectively presented in the classroom, wildlife biology should be broadly integrated into the curriculum. It must become a component of the variety of subjects studied throughout the year, rather than remaining an isolated topic looked at once, and briefly. Teaching kits that are not tailored to the curriculum are awkward to use, and make it

necessary to postpone other lessons. Prepared curriculum-compatible lesson plans avoid this problem, and increase the likelihood of any teacher using them by doing part of the work for him.

Curriculum integration is also most beneficial from the wildlife manager's point of view. If children view wildlife as something to study for a few days once a year, the topic will make no lasting impression on them. But if it is made a part of the year-round classroom environment, it will become part of the world as children see it. We hope Project Wild, which the Canadian Wildlife Federation is bringing to Canada from the U.S. and will be adapting for Canadian teachers' use, will do this. Without this kind of educational package, the job of preparing curriculum-compatible lesson plans for a wide range of topics would be a tough one. The elementary teachers themselves often lack the time or expertise required. Interdisciplinary professionals with a background that includes education and wildlife management would be the logical choice. But wildlife agencies might have to finance such projects.

The teachers, like the lessons, must be prepared. Teachers may hesitate to use wildlife lesson plans if they lack confidence in the subject matter. Many do, since most of Ontario's elementary teachers have arts rather than science backgrounds. Ontario's teacher-training colleges stress methods of teaching and do not provide science content. If neither the universities nor the training colleges are going to give the teachers a background in fundamental wildlife conservation, wildlife managers may have to do it themselves.

Although any occasion that permits direct contact with teachers should be used, professional-development days are an ideal time for wildlife managers to meet with teachers. For example, a full-day workshop on wildlife management could begin with a session that would acquaint teachers with some of the basics of wildlife biology, and progress to a session that would introduce the curriculum material and show teachers how to use it in their classrooms.

A full-fledged education program of this nature is admittedly an ambitious undertaking. Few, if any, wildlife agencies in Canada have gone this route. It would call for a commitment of money and staff and would require, above all, coordination. Ontario's wildlife managers are examining such possibilities.

In the meantime, there are many jobs that can be done, many approaches that can be taken, and many people who can be involved in educating young people about wildlife. In Ontario, we would like to include the private sector as much as possible in the education process. The Ontario Federation of Anglers and Hunters is pioneering such involvement with a project called "Adopt-a-School." The Federation of Ontario Naturalists has developed education kits with our help. We hope that these examples signal the beginning of a movement in public participation in wildlife-related education. Ontario's participation in National Wildlife Week has also been steadily increasing as more staff members play active roles and as teachers become more aware of that program. We strongly support and feel that Canadian wildlife agencies can work together to improve it. In addition, we are looking forward to the Canadian Wildlife Federation's bringing Project Wild to Ontario, and hope to be actively involved in promoting its use by educators.

In Ontario, we feel that educating young people about wildlife can be one of the most productive ways of spending a large part of our wildlife-management time and dollars. We believe that unless we impart a knowledge and appreciation of wildlife to Ontario's young people, we will be fighting a losing battle as we try to maintain wildlife over the long term. Teaching tomorrow's decision-makers about wildlife is an excellent investment in the future of wildlife management and conservation.

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Trapping

Its Evolution to Participatory Management and Wild Furbearer Husbandry

The explorers looking for an easier sea route to the spices of the Far East came against a long forgotten continent that blocked their quest for instant fame and riches. Instead of ginger, cinnamon and pepper, they found Indians willing to trade beaver, otter and marten. To a fur starved Europe, and what is now U.S.S.R., this proved to be wealth far beyond that which India and the Far Eastern countries could offer.

The Jesuits, soldiers and explorers found in the St. Lawrence and along the whole breadth of the eastern seaboard, Indian nation states that had adaptable social organizations, and advantageous political and economical structures. Although initially the White Man could not penetrate but a few miles from their then gorgly-looking ocean ships, the Indian tribes did travel and trade far beyond their territories.

The Indians initially hunted beaver, muskrat, and other furbearers primarily for food and secondarily for their skins. Archaeologists report a dramatic increase in the incidence of beaver and other furbearer bones as the primary purpose of the hunt was soon reversed. The period from 1600 to 1800 was characterized by an increasingly, ruthless exploitation of furbearers and the natives. Consequently furbearer populations declined noticeably. This was exacerbated further when, in 1794, Newhouse introduced his famous leg-hold traps[1] that quickly replaced dead-falls, spears and trenching. Also, trapping began to be done primarily by the Newcomers who together with the Indians and Eskimos became entangled in a feudal economic web from which there was no escape. The Hudson's Bay Company and other traders issued advances of food and essential goods in exchange for all the skins the Indians could produce. So powerful was the system that in a few very remote areas it persists even today.

To stem the tide of declining game populations, responsible governments in Upper Canada passed a smattering of weak legislation beginning in 1793[2] and continuing for the next 67 years. But it wasn't until 1860 that the first comprehensive furbearer law was passed and this law closed the trapping seasons for beaver, otter and other furbearers from the first day of May to the first day of November. In 1886, a law provided for appointment of "game protectors" by any county, town, township or incorporated village; and citizens were offered substantial rewards for telling on poachers. For the next 56 years we see seasons adjusted and eventually closed. In 1893, the first four Game Wardens were hired for the Province and the number of Deputy Wardens increased to 413 (there were 527 by 1897).

With the necessary closure of the beaver trapping season for 24 years in the late 1800's and early 1900's, far sighted men realized even then that furbearers were not inexhaustible and that you cannot manage a valuable living resource over vast areas by simply adjusting seasons and hiring wardens to enforce the laws. This is a lesson that most jurisdictions are just now beginning to grudgingly recognize with big game and game birds. So, in 1890, a "Board of Fish and Game Commissioners" was convened to arrest the decline of game and fish in the Province.

We will perhaps never know who the wise man or men were, but in 1911, Ontario's last Game Comissioner, Kelly Evans, tabled a report which launched the most sophisticated fur management program in the world and, since he signed the report, we acknowledge him as the father of fur management in Ontario.

1 Although the leg-hold trap was known as early as the 12th century, it was probably not till Newhouse came out with his dependable, strong, small traps that they could be used on a large scale. Initially the leg-hold traps were very large with teeth and their primary use was to catch poachers on Lord's estates.

2 An Act was passed to encourage the destruction of bears and wolves in different parts of this province.

In his exhaustive report, Evans called for the licensing of trappers and dealers, and required that all trappers and buyers keep accurate records, branding (sealing) of pelts of furbearers, meaningful seasons, quotas (through a sale of five coupons for $2.50 which had to be attached to beaver and otter pelts, quotas and royalties became a fact of furbearer management), and the creation of licence specific trapping areas. Most of his recommendations became law by the 1920's and because trappers paid money (royalty) for their coupons, government accountants made others keep records of what was harvested. Thus, today's excellent harvest records go back to 1920. However, although other provinces such as British Columbia established traplines in 1925, that recommendation was not implemented in Ontario. It was a long time before the folly of that was realized but it took until 1950 to correct it. Beaver trapping in Ontario in the 1930's had to be closed for 2 years because of scarcity. So a third lesson was learned.

The first important lesson learned was that furbearer populations were not limitless; the second was that simple management, using season adjustments to control the numbers killed and enforcement did not work; and now it became evident that the Commons approach to wild animal husbandry did not work either.

Furthermore, some realized that you cannot continue harvesting without eventually putting something back.

The 1920's saw the creation of Crown Game Preserves to try to provide breeding sanctuaries for furbearers. However, most credit must go to J.S.C. (Jimmy) Watt of the Hudson's Bay Company for the establishment of the James Bay Beaver Preserves and his work with the Indians. On the Rupert's House Preserve, for example, the harvest of beaver increased from 25 in 1930 to 15,000 in 1944, all as a result of Watt's conservation work.

Although Kelly Evans was probably no longer read or remembered by men in the late 1930's, people searched for a solution to the problem that had plagued them for 150 years. How could furbearer populations achieve stability and how could trappers manage their areas if there was no protection from others on the Commons? The solution was the registered trapline system.

Ralph Bice of Kearney, a small village on the west side of Algonquin Park, remembers trappers discussing the creation of the traplines at local meetings in 1943 (R. Bice, personal communication). By 1947, many districts had hammered out trapline boundaries and maps were drawn so that by 1950, 39 years after Kelly Evans issued his report, a regulation was passed in Ontario which created traplines over much of the Crown Lands, which still make up about 90% of Ontario. Almost immediately, things changed for the better and poachers had a more difficult time of it.

Also about that time, furbearer management got a simultaneous boost through the start and rapid advances in the science of wildlife management. Myths, intuitions and feelings could now be replaced by facts and the scientific method of studying problems.

Following the short post World War II boom in fur prices, the industry entered a depressed state for the next two decades; prices for pelts were very low; children from the country continued to move to the cities; country living was not fashionable; and the number of trappers decreased. Those trappers who remained reasoned that there had to be alternatives to the Hudson's Bay Company and itinerant fur buyers, and so in 1947, trappers organized themselves into the Ontario Trappers Association and began an auction system of marketing their goods. This approach eventually benefited financially all the trappers in North America. The creation of the Association, the creation of the registered traplines, and the emergence of animal welfare groups fostered a close working relationship between the trappers and the government, and an openness to share ideas which persists today.

Now, participatory management, as we like to call it, implies that the trappers have a share in managing themselves, the public resource and that this is expected of them. In this they are unique and more advanced than hunters, sports and commercial fishermen. Trapper's meetings are not the vitriolic confrontations that so often characterize the anglers' and hunters' meetings, and trappers are becoming involved in management and planning discussions right from the beginning.

Today the Industrial Revolution is dead and we are being jettisoned with the speed of light into the Computer and Space Age. Scientific advances are enabling the world's populations to increase. In Ontario, 6 million people live in about 10 percent of the Province which is privately owned. By the year 2000, there will be between 8-10 million people in Ontario and at least 6 billion in the world. Such increases can have devastating effects on the land and its ability to produce wildlife. Garrett Hardin's article on *Denial and Disguise in Managing the Commons* (Edited by G. Hardin and J. Badin, Freeman & Co. 1977), sums it up well:

> "They clap in gaol the man or woman who steels the goose from the common; but let the bigger knave go loose who steels the common from the goose."

The increase in human populations presents conflicting forces: those that own the land or access to it (the suppliers) want to have a say in how the resource is managed and want to have financial returns for access to the game or trees and other resources; while those that don't have free access to it (the buyers) want it for free or for very little cost. The sooner we accept the fact that the owner of the land should be paid for the use of the furbearers, fish and game on that land, the better both groups will prosper. Unless the landowner will profit from having animals on his land, he will not be able to afford or want to keep them in the future. The provincial governments have for a long time demanded royalties for managing the furbearer resources and it is now time that the landowner got his fair share as well.

The Computer and Space Age means more time, more money to buy goods and a greatly increased knowledge. This is achieved through better methods of storing and retrieval of data and rapidly disseminating that information. According to those that have studied the situation, all the world's knowledge gained up to the year 1600 was doubled by 1900, doubled again by 1950, doubled again by 1975 and now it doubles every 5 years. Computer enhanced brains are here today and some say the scientist is today's priest.

Trapping now is where agriculture was about 8,000 years ago when human groups roamed over large areas and harvested whatever they could opportunistically. The big change occurred when crops were planted, herds began to be "herded" however loosely, and selected individuals were harvested. At present, agriculture is in the genetic engineering phase, opening undreamed of horizons.

Men and women today are making that 8,000 year old transition from harvesting animals at random to *furbearer animal husbandry*. This requires that furbearers be fed (some 90% of fisher trappers in the Algonquin Region of southern Ontario claim to feed fisher), protected and selectively harvested to improve stock vigor and to accentuate desirable features.

Trappers in the past and today set traps intended to catch one of several species. This is dictated more by trap technology than by choice. A Conibear 330 set in a water channel or on a beaver dam runway can catch mink, wolverine up north, otter, raccoon, a beaver kit or one of the successful breeding pair and depending on the set, a cat or a dog. This is comparable to a farmer deciding to market 10 steers from his herd and setting powerful 2 sq. m. Conibear-type killing-traps near salt blocks and on trails in a field that has five goats, two sheep, three pigs, 120 cattle, four horses and some cats and dogs. What a disruptive effect this would have on the animals and on the farmer's livelihood. What breed advancement could there be?

The future of furbearer animal husbandry will require that most species will be caught in humane live-holding traps to permit the trapper, as the primary manager, to selectively harvest specific, expendable sex and age groups and to release those not wanted or those of superior quality whose gene pool is desirable to be maintained. An exception to this are those species such as the muskrat and the red squirrel that have very rapid rates of turnover; for example, the muskrat's 12 month survival rate is about 88 percent. In this case very selective, multiple catch traps are necessary and desirable.

Whatever traps are used, one thing is certain: the harvesting and killing of furbearing animals will have to be done absolutely humanely and with a purpose or benefit to the species. There is no question about that. The world in the future can do without the fur trade, it always could. Aggressive postures such as those adopted by the sealers, fur dealers and government officials over the white-coat sealing issue are self-defeating, anti-productive and actually help to enhance the position of anti-sealing groups on the world stage.

In the future, and as human populations continue to expand, the general public may not be allowed to go hunting, trapping and fishing for fun. There will have to be a demonstrated purpose and this purpose will be primarily for the benefit of the species, or the ecosystem as a whole. Examples of this are some of the advanced big game management systems on reveres in Europe (A. Bubenik, personal communication).

By the year 2000, the role of the trapper will change to that of the primary manager and the scientist's responsibility will be to collect and analyze and disseminate data through developing soft-ware programs and to act as a consultant to the primary manager and to the landowner.

As in the last 150 years, whenever major problems occurred with furbearers, people have met the challenges and turned the problems to the benefit of themselves and the furbearer. Interestingly, both seem to go together. Today there is a significant social change taking place in the world and the majority of people are saying "Wait a minute, species everywhere are going extinct, most are mismanaged, and many are being cruelly killed. Stop it." I see this as a very timely and beneficial challenge giving us the opportunity and the needed urgency to make that 8,000 year old transition quickly, for in today's world, people do not have generations to adapt to new ideas and social pressures.

Milan Novak
Wildlife Services
Ministry of Natural Resources

Québec

Gestion de la Faune au Québec

Rapport d'Activités et Perspectives

1. Gestion de la faune aquatique

Au cours de 1982, le Service des espèces d'eau froide a consacré la majorité de ses efforts sur la gestion du saumon atlantique. Nous avons recueilli des données permettant de suivre la progression des stocks de la Gaspésie, de la Moyenne Côte-Nord et d'Anticosti. Le système de gestion privilégié est basé sur le suivi détaillé de rivières témoins en particulier les rivières St-Jean, Bec-scie et Baie Trinité.

En 1983-84, les activités de ce Service seront consacrées à valider les photos-interprétations du fond de 25 rivières de la Moyenne et Basse Côte-Nord. Ce travail nous permettra d'éliminer certaines rivières qui ne sont pas fréquentées par le saumon et de dresser une liste des principales rivières qui devront faire l'objet d'amélioration, dans les cinq prochaines années.

Au niveau de la gestion des stoks de saumon du Golfe Saint-Laurent, principalement ceux affectés par les problèmes d'interception et de braconnage, le Service a été particulièrement actif dans sa participation aux activités du C.A.F.S.A.C. (Canadian Atlantic Fisheries Scientific Advisory Committee), ainsi que des comités de concertation interprovinciale Québec — Nouveau-Brunswick concernant la gestion du saumon de la rivière Restigouche. Enfin, des ententes provoyant l'interdiction complète de la pêche commerciale à l'embouchure des rivières à saumon ont été conclues avec le ministère de l'Agriculture, des Pêcheries et de l'Alimentation du Québec.

En ce qui concerne les autres espèces d'eau froide, nous croyons intéressant de signaler que le ministère a organisé un colloque sur la gestion de l'omble de fontaine au Québec. On retrouve dans le compte-rendu publié par le ministère, l'essence des connaissances biologiques à date. Quant aux perspectives pour l'an prochain, la priorité a été mise sur le développement de modèles d'exploitation des populations d'omble de fontaine associées à des espèces de poissons hautement compétitrices.

Le Service des espèces d'eau fraîche n'existe que depuis quelques mois. Il regroupe les spécialistes préoccupés par des problèmes reliés à l'utilisation des espèces d'eau fraîche telles le doré, le brochet, la barbotte, la perchaude, etc..., ainsi que par les anoures et les arthropodes.

En terme de perspectives d'avenir, deux dossiers majeurs seront traités en 1983-84. Le premier vise la production d'un plan de gestion des pêches commerciales dans les eaux sans marée incluant un modèle de répartition de la ressource entre les sportifs, les pêcheurs commerciaux et les autochtones. Le second touche le problème des précipitations acides.

Dans ce cadre, divers projets seront mis de l'avant pour évaluer les impacts des précipitations acides sur les espèces d'eau fraîche. De plus, des ententes sont intervenues avec l'Etat de New-York pour réaliser des bio-essais avec différentes souches de poissons québécois et new-yorkais en milieu acidifié.

Outre le contrôle de la quantité et de la qualité de la production piscicole dans les stations gouvernementales, le Service de l'aquaculture a entrepris l'élaboration d'une politique piscicole visant le développment harmonieux de ce secteur tout en permettant une protection adéquate du patrimoine faunique, une meilleure efficience des interventions et une orientation de la recherche piscicole.

Le Service de l'aquaculture a également concentré ses travaux dans le domaine de la santé du poisson. Ainsi, un vaste échantillonnage de poissons a été fait dans les lacs du Québec pour dépister la présence de certaines maladies de poisson dans le milieu naturel. De plus, il y a eu, dans les stations piscicoles, la recherche de moyens préventifs et curatifs pour diminuer les pertes de poissons dues aux maladies.

Au cours de l'année prochaine, le Service de l'aquaculture entend consolider le programme de santé du poisson par l'application de mesures préventives.

Le développement de certaines techniques piscicoles fera également l'objet de notre attention. Il s'agit plus particulièrement du reconditionnement de géniteurs de saumon et de ouananiche, du développement de lignées de poissons adaptées à des conditions spécifiques: eau acide, croissance rapide, développement en estuaire, etc... et du développement des techniques de recirculation de l'eau.

2. Gestion de la faune terrestre

L'année 1982 fut très fructueuse en événements importants concernant la gestion de la faune terrestre. Après une longue série de consultations, le modèle de gestion de la récolte des animaux à fourrure a été modifié. Globalement, le système de terrains de piégeage enregistrés a été réduit et orienté en fonction des usagers qui recherchent avant tout le revenu. Pour ceux qui sont plus préoccupés par des activités de loisir ou de loisir-revenue, un système d'unité de piégeage a été mis en place permettant un accès plus facile et une démocratisation de cette activité.

Les réserves fauniques et les zones d'exploitation contrôlées (ZEC) du Québec seront gérées à partir du système d'unité de piégeage alors que les terrains privés et les terrains publics près des centres urbains ne feront l'objet d'autres réglementations que la réglementation générale sur le piégeage. En 1983-84, les énergies seront consacrées à mettre en place ce nouveau modèle de gestion et à le rendre opérationnel.

Quant à la gestion du gros gibier, nos efforts ont porté sur l'évaluation des effets des prédateurs tels l'ours et le loup sur nos populations de grands cervidés. Beaucoup d'énergies furent également consacrées à des travaux de recherche visant à mettre au point des moyens de contrôler l'expansion du troupeau de caribous du George.

Comme perspectives pour 1984, nous devrions être en mesure de proposer une stratégie de gestion des prédateurs au Québec. Dans le cadre des ententes avec les autochtones, les travaux visant à déterminer le niveau de récolte garanti occuperont une grande partie de nos énergies.

Pour les populations d'ongulés sauvages, la dynamique de leurs répartitions est suivie par le biais d'inventaires quinquennaux. La récolte par la chasse sportive est évaluée à chaque année. Si, dans une ou des zones, un

niveau de "sur-récolte" est appréhendé, la réglementation concernant cette ou ces zone(s) est modifiée de façon à la corriger. Les répercussions de la mise en eau des réservoirs hydro-électriques sur la faune sont étudiées dans le nord québécois. Les taux d'ovulation et de mise bas de l'orignal sont mesurés dans les zones de chasse.

L'influence de diverses pressions de chasse sur la densité d'orignaux est estimée. Le régime alimentaire et l'abondance de l'ours noir dans l'aire de répartition de l'orignal sont évalués. De plus, on cherche à connaître l'impact socio-économique et cynégétique de l'augmentation de la taille des groupes de chasseurs d'orignaux. Dans un avenir prochain, on cherchera à optimiser la récolte d'orignaux en considérant deux pratiques de gestion: les îlots de dispersions et une certaine uniformité dans la densité d'originaux.

Les travaux sur la sauvagine ont porté sur les inventaires des populations d'oiseaux et de la protection de leurs habitats. Ces inventaires ont eu pour but de préciser les impacts reliés aux différents projets de développement et de mettre au point les plans de zonage du territoire.

Les efforts pour protéger les habitats de la faune furent orientés en priorité vers les terres humides de la Vallée du Saint-Laurent. La classification des terres humides y est amorcée. De plus, les questions de réserves fauniques pour protéger des habitats exceptionnels tels que Kamouraska et Rivière du Sud furent annexées en juin 1982. Enfin, le lac Saint-Pierre a fait l'objet d'un plan directeur pour sa conservation et sa mise en valeur.

Au cours des prochaines années, les interventions du ministère du Loisir, de la Chasse et de la Pêche seront orientées en fonction des lignes directrices du plan de gestion des oiseaux aquatiques au Québec, plan préparé conjointement avec le Service canadien de la faune auquel participeront divers organismes privés.

Une révision de la réglementation concernant la capture et la garde des oiseaux de juridiction provinciale est en cours. L'utilisation d'oiseaux de proie pour la fauconnerie fera sous peu l'objet d'une prise de position de la part du ministère du Loisir, de la Chasse et de la Pêche.

En ce qui concerne les autres espèces de petits gibiers et animaux à fourrure, nous procédons à la prioritisation des principales espèces sur lesquelles devront porter nos interventions. Par ailleurs, les projets de recherche sont actuellement en cours tels que ceux portant sur le raton laveur, la martre et le lynx.

Direction Générale de la Faune
Ministère du Loisir, de la Chasse et de la Pêche

Québec

La Gestion des Ressources Fauniques

La gestion des ressources fauniques relève du ministère du Loisir, de la Chasse et de la Pêche dont fait partie la Direction générale de la faune. Cette Direction générale a été restructurée en mars 1982 et elle a été formée des directions de la faune terrestre, de la faune aquatique, des territoires fauniques et de la conservation de la faune. En plus, on y retrouve la Direction générale des opérations régionales à laquelle sont rattachés les services d'aménagement et d'exploitation de la faune et de la conservation de la faune.

Les objectifs de la Direction générale de la faune sont les suivants:

Assurer le maintien, l'amélioration a la protection des ressources fauniques sur le territoire québécois en recherchant l'équilibre écologique et l'utilisation rationnelle de ces ressources.

- Analyser l'état des ressources fauniques et des milieux dans lesquels elles vivent et se développent et déterminer les besoins qui s'en dégagent au plan de leur aménagement, de leur exploitation et de leur conservation.
- Evaluer en regard de ces besoins l'impact des politiques et des programmes mis en oeuvre et concevoir, en les adaptant, les modes de gestion et d'exploitation les plus aptes à équilibrer l'offre et la demande et à assurer le développement et la perpétuation des espèces.
- Définir les priorités et les normes d'allocation des ressources utilisées dans le cadre des programmes visant la faune ainsi qu'une stratégie générale d'intervention en matière faunique.
- Procéder à des travaux d'analyse et de recherche susceptibles de conduire à une meilleure compréhension des problèmes reliés à la gestion de la faune et de son habitat, et de permettre d'y apporter des solutions.
- Veiller au respect des obligations qui incombent au ministère en vertu de la Convention de la Baie James et du Nord Québécois et de la Convention du Nord-est québécois ainsi qu'au maintien des relations devant exister entre le ministère, les communautés autochtones et ceux qui les représentent; coordonner l'action du ministère en milieu autochtone et s'assurer particulièrement du respect des coutumes du milieu.

Les objectifs de la Direction de la faune terrestre sont les suivants:

Assurer le maintien et l'utilisation optimale de la faune terrestre en s'appuyant sur une politique d'aménagement efficace, notamment quant à son habitat, et sur une exploitation rationnelle.

- Proposer des objectifs et définir des orientations au plan de la faune terrestre et coordonner les actions qui en découlent et notamment:
  a) coordonner la préparation et la mise en oeuvre de la programmation annuelle des interventions du ministère portant sur la gestion de la faune terrestre et de ses habitats;
  b) définir le cadre normatif applicable aux plans d'aménagement et aux modes d'exploitation à mettre en oeuvre au plan régional;
  c) développer et mettre en application, de concert avec les régions, méthodes et techniques d'inventaire, d'analyse et d'interprétation adaptées aux diverses espèces qu'elles visent à connaître;
- Représenter le ministère aux conférences, tables de concertation, groupes de travail et projets d'études dont les travaux concernent la faune ou qui sont menés conjointement avec des représentants d'autres juridictions et agir comme représentant du ministère en ce qui concerne les oiseaux migrateurs.

- Fournir l'assistance technique requise par les services régionaux du ministère et par les sociétés d'exploitation et de la conservation de la faune.

Les objectifs de la Direction de la faune aquatique sont les suivants:

Assurer le maintien et l'utilisation optimale de la faune aquatique en s'appuyant sur une politique d'aménagement efficace, notamment quant à certains milieux menacés, et sur une exploitation rationnelle.

- Proposer des objectifs et définir des orientations au plan de la faune aquatique et coordonner les actions qui en découlent, et plus spécifiquement:

  a) coordonner la préparation et la mise en oeuvre de la programmation annuelle des interventions du ministère portant sur la gestion de la faune aquatique et de ses divers milieux de vie et de reproduction (dont les frayères et les marais);

  b) définir le cadre normatif applicable aux plans d'aménagement et aux modes d'exploitation à mettre en oeuvre tant pour les espèces vivant en eau chaude que celles vivant en eau froide, dont le saumon;

  c) développer et mettre en application, de concert avec les régions, des méthodes et techniques d'analyse, d'inventaire et d'interprétation adaptées aux diverses espèces qu'elles visent à connaître;

- Elaborer les normes applicables à l'émission de permis d'exploitation de la faune aquatique ainsi qu'à celle de baux de location de droits de pêche sur le territoire québécois.

Les objectifs de la Direction des territoires fauniques sont les suivants:

Planifier, coordonner et surveiller l'utilisation des territoires sous la régie du ministère en raison de leur caractère faunique et développer des politiques et normes de gestion qui font appel à la participation et à l'initiative des usagers ou de ceux à qui des droits sont concédés.

- Compte tenu des besoins de la population et de l'état des ressources, proposer des orientations aptes à assurer une exploitation rationnelle et une saine gestion des territoires fauniques et définir à leur égard une stratégie générale d'intervention et une politique générale d'accessibilité.
- Développer et mettre en oeuvre pour donner effet à ces orientations, des plans d'intervention ainsi que des normes et critères appropriés à chaque catégorie de territoire et veiller à leur harmonisation avec les besoins constatés et la réalité du milieu.
- Apporter aux associations et organismes responsables de territoires désignés l'expertise du ministère et son support technique en matière de gestion et d'exploitation et de services à rendre aux utilisateurs de la faune.

Les objectifs de la Direction de la conservation de la faune sont les suivants:

Assurer la protection de la faune du Québec en informant et en éduquant le public et les utilisateurs à la conservation de la faune, en faisant connaître les lois et règlements relatifs à la chasse et à la pêche et en assurant leur respect.

- Concevoir, développer et mettre en application des politiques, des programmes, des normes, des critères de la faune compte tenu des ressources disponibles et en mettant l'accent sur le développement du personnel chargé de cette protection.
- Etablir à cette fin en concertation avec les responsables sur le terrain, à partir de la problématique propre à chaque secteur et à chaque espèce, des plans de protection adaptés aux besoins, aux situations particulières et à l'expérience vécue.

Direction Générale de la Faune
Ministère du Loisir, de la
Chasse et de la Pêche

Saskatchewan

A Wildlife Management Success

Large Canada Geese in Saskatchewan

The Canada goose, symbol of all that is wild and free, is alive and well in Saskatchewan! This article will feature the large Canada geese which breed in Saskatchewan and adjacent prairie regions, unlike the smaller races which migrate to Arctic breeding grounds. With help from man, populations of these "honkers" have grown tremendously during the latter half of this century.

Saskatchewan goose workers with subject

The large Canada geese were hard hit by persistent hunting and egg robbing during agricultural settlement of the West, and were extirpated from large areas. A pioneer from Barber Lake, near Saskatoon, recently recounted that he saw only one brood of large Canadas on that lake during the first 50 years that followed his 1905 arrival. Now, large Canada geese are common breeders on Barber Lake, as they are on many marshes throughout agricultural Saskatchewan.

The settlers' need for food and the lack of game management at the time had disastrous consequences for large Canada geese. Several factors contributed to their vulnerability, including their large size, early arrival in spring, territorial defence behavior and inability to fly during the summer molt. Herding flightless goslings into captivity was a traditional practice on at least one major Saskatchewan marsh. Since World War II, game management, including enforcement, has intensified in Saskatchewan. This, combined with improvement in the rural economy, has enabled a comeback by large Canada geese.

The growing numbers of large Canada geese are reflected in the waterfowl breeding population data obtained annually by the U.S. Fish and Wildlife Service and the Canadian Wildlife Service. In May 1982, there were an estimated 23 thousand large Canada geese breeding in agricultural Saskatchewan compared to an average of 12 thousand during the preceding ten years. Two populations are represented. The Hi-Line population occurs in the south-western corner of the province as well as in Alberta, Montana and Wyoming, and mainly winters in Colorado. Western Prairie birds occur in eastern Saskatchewan, and Manitoba, wintering in South Dakota, Kansas and Nebraska. Some non-breeding geese from throughout the Prairies migrate to the Northwest Territories in the summer to molt.

A stocking program has supplemented the natural growth of Saskatchewan's Canada goose populations. This program has utilized the tendency of female Canada geese to breed where they learn to fly, even if they wander extensively in the interim. During the 1960's, Ducks Unlimited placed 1,300 geese in 10 locations, notably the Montmartre area southeast of Regina. The Wildlife Branch of Saskatchewan Tourism and Renewable Resources (D.T.R.R.) has headed the program since 1970, stocking 6,400 geese in 26 locations concentrated in the southeast and northwest portions of the agricultural region. The recent work has been done with the cooperation of the Canadian Wildlife Federation. Wascana Centre Authority in Regina has been a major participant in that 80% of the geese have been produced by the Wascana flock. The remainder came from a goose rearing project operated by D.T.R.R. at Eyebrow Lake during the 1970's.

Canada Geese from a wild flock relocated to a Saskatchewan lake

The Wascana goose flock in Regina is an integral part of the recent history of large Canada geese in Saskatchewan. The flock was started in the early 1950's when several pairs of geese were introduced to Wascana Lake by Fred Bard of the Saskatchewan Museum of Natural History. They were very successful and prolific. There is now a relatively stable population of approximately 225 pairs breeding in the friendly confines of Wascana Centre Authority, which is located near the centre of the city. For many years the annual production of approximately 600-700 goslings has been relocated to limit further population growth in Wascana and to provide seed stock for vacant habitat around the province.

Wascana geese are managed through all seasons. Several thousand large Canada geese stage on the lake during the fall, utilizing permanent lure crop provided by the federal-provincial Waterfowl Crop Depredation Prevention program. For many years, the operation of a power station maintained open water during the winter, creating a favourable wintering area. The power plant has closed down and the lake freezes over now, yet significant numbers of geese continue to winter successfully there, feeding on grain supplied by the Saskatchewan D.T.R.R. and Wascana Centre Authority during severe weather.

Large Canada geese have been affected by the drainage of wetlands; however, important work is being done to preserve and enhance Canada goose habitat in Saskatchewan. Ducks Unlimited is creating islands in many of its wetland projects, providing highly suitable nesting areas. For this reason, 50% of the geese stocked during the 1970's and early 1980's have gone to Ducks Unlimited projects. The Saskatchewan Wildlife Federation and individual landowners have made improvements on a smaller scale by placing large round bales in suitable marshes. These have proven to be well used throughout the prairies by nesting geese and provide safe nesting and loafing sites for ducks.

The goose hunting regime of the last 25 years, entailing a 5 bird daily bag limit and a season of approximately 90 days, has permitted the growth in large Canada goose populations. Enforcement of these regulations by an expanded crop of conservation officers has been the key factor in their success. These regulations will probably remain constant in the near future, although refinements may be made from time to time.

Large Canada geese are obviously capable of co-existing with man on the prairies, given suitable wetland habitat and regulated harvesting. All things considered, it looks as if the "honker" is here to stay.

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Canadian Wildlife Service

Going South

Latin American Program

Service Canadian de la Faune

Direction Sud

Le Programme d'Amérique Latine

For many years the Canadian Wildlife Service (CWS) focused much of its attention on waterfowl, working mostly with the United States where most of these birds spend the winter. However, of some 500 other species of birds breeding in Canada, about 225 migrate to Latin America — Mexico and Central America, the Caribbean islands, and continental South America. Conservation and management efforts in Canada would be wasted if birds we share with countries further south were not protected while there.

In 1980, the CWS started the Latin American Program (LAP) to promote conservation of the birds we share. In some Latin American countries, social, political and economic problems tend to suggest that wildlife conservation is something of a luxury. Nevertheless, there is a clearly-expressed interest in cooperation with Canada by our counterpart wildlife agencies in Latin America.

Initially, CWS spent several months defining likely conservation issues from our point of view and consulting people with first hand ecological experience in Latin America. This confirmed that problems there are similar to those of North America but sometimes the scales are different. Habitat destruction and loss, the use and misuse of agricultural chemicals and industrial pollution were the gravest problems identified. Scientists from the Organization of American States (OAS) countries are attempting to revitalise a 1940 convention: *"The Convention on Nature Protection and Wild Life Preservation in the Western Hemisphere,"* to increase cooperation and to seek greater international conservation of migratory species. In Panama, in 1979, they identified research needs and objectives. They recognized that there would be great advantages if all countries cooperated.

Some needs were: to support and expand bird banding programs and coordinate efforts to make the data comparable; to monitor pollutant levels through indicator species and standardize monitoring techniques; to list critical habitats; and, to consult on management decisions involving shared migrant species.

Pendant de nombreuses années, le Service canadien de la faune (SCF) s'est penché surtout sur la sauvagine, travaillant principalement avec les États-Unis, pays où hivernent la plupart de ces oiseaux. Cependant, des quelque 500 autres espèces nichant au Canada, environ 225 émigrent en Amérique latine, c'est-à-dire au Mexique et en Amérique centrale, dans les Caraïbes et dans les terres continentales d'Amérique du Sud. Les activités de conservation et d'aménagement réalisées au Canada seraient vaines si les oiseaux présents ici à certaines périodes n'étaient pas protégés pendant qu'ils séjournent dans des pays du Sud, en d'autres saisons.

En 1980, le SCF a mis en oeuvre le Programme d'Amérique latine (PAL) en vue d'encourager la conservation des oiseaux qu'ils ont en commun. Dans certains pays d'Amérique latine, l'ampleur des problèmes sociaux, politiques et économiques porte à croire que la conservation de la faune est en quelque sorte un luxe. Néanmoins, les organismes fauniques de ces pays s'intéressent manifestement à une collaboration avec le Canada.

Au début, le SCF a passé plusieurs mois à déterminer les questions de conservation dont nous pourrions probablement traiter, et à consulter les personnes ayant des connaissances en écologie de l'Amérique latine. Ainsi, nous avons eu la confirmation que les problèmes qui existent en Amérique latine sont semblables à ceux que nous connaissons en Amérique du Nord mais que parfois leur envergure diffère. La destruction et la perte des habitats, l'utilisation, parfois mauvaise, des produits chimiques agricoles et la pollution industrielle constituaient les problèmes les plus graves.

Les scientifiques des pays faisant partie de l'Organisation des Etats américains (OEA) s'efforcent de remettre en vigueur une convention de 1940, *La Convention pour la protection de la flore, de la faune et des beautés panoramiques naturelles des pays de l'Amerique*, afin d'accroître la collaboration et d'assurer une plus grande conservation internationale des espèces migratrices. A Panama, en 1979, ils ont déterminé les besoins et les

These needs were compatible with CWS objectives in Canada, and for the LAP. Thus they became part of our operating philosophy.

The next step was to visit some Latin American countries to introduce the CWS and the LAP. Our reception was warm and we found Latin American wildlife agencies willing to work with us to promote the conservation of shared birds.

We are not alone in our interest in Latin America. In the past decade, international organizations such as the International Union for the Conservation of Nature, World Wildlife Fund, International Council for Bird Preservation and International Waterfowl Research Bureau have developed projects and programs specifically for Latin America. The US Fish and Wildlife Service has also initiated a Latin American program, with aims similar to ours. The Canada and US programs operate independently but we are in close contact to avoid duplication.

Shorebird Studies

Thirty-three shorebird species breed in Canada and migrate south, making them one of the most important species assemblages we share with Latin America. While here, most shorebirds are highly dispersed, breeding over a wide geographic area and a range of habitats from southern Canada to the high Arctic. Canada also provides a series of critical staging and stopover areas such as the Fraser Delta, James Bay, St. Lawrence estuary and the Bay of Fundy. When migrating and on the wintering grounds, shorebirds congregate in large numbers, making them vulnerable to disturbance and disruption of habitat. The wintering areas range from the US and the Caribbean to the southernmost part of South America. If conservation of these birds is to be effective, it is necessary to know where they congregate, what habitats are of most importance to them and whether and how their main staging and wintering places are protected.

objectifs de recherche. Ils ont reconnu que les avantages seraient beaucoup plus grands si tous les pays collaboraient.

Voici quelques-uns des besoins: appuyer et élargir les programmes de baguage des oiseaux et coordonner les efforts afin que les données soient comparables; mesurer les niveaux des polluants grâce à des espèces indicatrices et normaliser les techniques d'échantillonnage; dresser la liste des habitats vulnérables; et consulter les intéressés au sujet des décisions d'aménagement touchant les espèces migratrices communes. Ces besoins étant compatibles avec les objectifs du SCF au Canada et pour le PAL, ils ont été intégrés à notre philosophie de travail.

L'étape suivante consistait à aller dans certains pays d'Amérique latine afin de faire connaître le SCF et le PAL. Nous avons été chaleureusement accueillis et nous nous sommes rendu compte que les organismes fauniques d'Amérique latine étaient disposés à collaborer avec nous pour favoriser la conservation des oiseaux qu'ils ont en commun.

Nous ne sommes pas les seuls à nous intéresser à l'Amérique latine. Au cours de la dernière décennie, des organisations internationales, comme l'Union internationale pour la conservation de la nature et de ses ressources, le Fonds mondial pour la nature, le Conseil international pour la préservation des oiseaux et le Bureau international de recherches sur les oiseaux d'eau, ont élaboré des projets et des programmes particuliers pour l'Amérique latine. Le US Fish and Wildlife Service a aussi lancé un programme d'Amérique latine dont les objectifs sont semblables aux nôtres. Les programmes du Canada et des Etats-Unis sont réalisés indépendamment, mais les deux pays sont en étroit rapport afin d'éviter tout chevauchement.

Oiseaux de rivage

Trente-trois espèces d'oiseaux de rivage nichent au Canada et émigrent en Amérique latine. C'est un des plus importants groupes d'espèces que nous avons en commun avec l'Amérique latine. Pendant leur séjour ici, la plupart des espèces d'oiseaux de rivage se dispersent beaucoup. Ils se reproduisent sur

The first major LAP project in South America was a survey of the northern and eastern coastline of South America to identify shorebird concentration areas and obtain a preliminary assessment of the distribution and characteristics of the habitat being used. The governments of Argentina, Brazil, Guyana, Guyane française, Suriname, Trinidad and Venezuela cooperated, even providing slow-moving military aircraft in some instances. About 95% of the Atlantic and Caribbean coast thought to contain suitable habitat has now been surveyed, and more than one million shorebirds counted and identified. Important wintering areas have been identified and, because the working parties consisted of CWS and Latin American biologists, this information became part of the host countries' knowledge immediately.

Pollution Studies

Shorebirds are hunted for food and recreation in some parts of Latin America, and in the Lesser Antilles. CWS and biologists there are attempting to measure this harvest. In addition, shorebirds there will be collected to determine levels of agricultural and industrial pollutant residues. This sampling program will be repeated elsewhere in South America by other teams. Ultimately, we expect to build up a picture of chemical contamination in migrating shorebirds.

A similar study, in cooperation with the Chilean Fisheries Service and a Chilean university professor, examined heavy metal levels in resident and migrant shorebirds in areas around the ocean outfall of a copper mine. This complete ecosystem/food web study was part of a wider Chilean study on effects of copper mine effluent on a marine ecosystem. An opportunity also arose to include a study of agricultural and industrial contamination of an estuary elsewhere in Chile.

une vaste superficie géographique et dans des habitats allant du sud du Canada à l'extrême Arctique. De plus, le Canada présente des aires de repos et de rassemblement critiques telles que le delta du Fraser, la baie James, l'estuaire du Saint-Laurent et la baie de Fundy. De très nombreux oiseaux de rivage émigrent et gagnent leurs habitats d'hiver ensemble, ce qui les rend sensibles aux dérangements et aux changements d'habitat. Les habitats d'hiver s'étendent des Caraïbes et des Etats-Unis jusqu'à l'extrémité méridionale de l'Amerique du Sud. Pour pouvoir les conserver efficacement, il faut savoir où se trouvent les aires de concentration des oiseaux en question, quels habitats sont les plus importants pour eux et dans quelle mesure, s'il y a lieu, leurs principaux lieux de repos et d'habitats d'hiver sont protégés.

Le premier grand projet du PAL était un relevé des côtes nord et est de l'Amérique du Sud visant à déterminer les aires de concentration des oiseaux de rivage et à obtenir une évaluation préliminaire de la répartition et des caractéristiques des habitats occupés. Les gouvernements de l'Argentine, du Brésil, de la Guyane, de la Guyane française, du Suriname, de Trinité et du Vénézuela ont collaboré au relevé, fournissant même dans certains cas des aéronefs militaires lents. On a fait le relevé d'environ 95% des côtes de l'Atlantique et de la mer des Caraïbes qui, dans l'opinion des experts comprenaient les habitats appropriés et on a identifié plus d'un million d'oiseaux de rivage. Les habitats d'hiver importants ont été déterminés. Puisque les équipes de travail comprenaient des biologistes du SCF et de l'Amérique latine, l'information obtenue a été diffusée immédiatement dans les pays hôtes.

Etudes sur la pollution

Dans certaines parties d'Amérique latine, on chasse les oiseaux de rivage pour se nourrir et se divertir. Dans les petites Antilles, le SCF et les biologistes locaux tentent de mesurer cette récolte. On y prendra des échantillons des oiseaux de rivage pour déterminer leur teneur en résidus des produits chimiques agricoles et des polluants industriels. Pareil échantillonnage sera effectué par d'autres

Such studies may help us understand chemical contamination problems faced by another migrant, the Peregrine Falcon. Monitoring of falcon eggs laid in the US and Canada in recent years indicates that some released birds and wild stocks have continued to accumulate high residues of organochlorine compounds such as DDE, (a breakdown product of DDT which causes eggshell thinning) despite restrictions on the use of DDT in Canada and an outright ban in the United States.

Efforts to reintroduce the *anatum* subspecies of the peregrine into its former range in Canada will be of little value if they acquire DDT, DDE and other residues on migration and on the wintering grounds. At present we do not know the source of contamination. We do know that peregrines prey heavily on shorebirds, and they often travel with and remain close to large flocks of shorebirds. The peregrines and their prey frequent the coastal areas which all too often, here and in Latin America, are used as deliberate or inadvertent dumping grounds by industry and agriculture.

Although DDT has been out of fashion in North America and Western Europe for the past 15 years, because of pest resistance or ecological side-effects, the amount produced per year has not changed appreciably since the early 1950's. Its site of manufacture and use has just moved farther south, closer to the equator.

Biologists in Latin America are aware of the problems caused by widespread use of DDT in the northern temperate world in the 1950's and 1960's. However, the nature and magnitude of problems in tropical and temperate parts of South America are much less known, although many suspect that the problems are there, waiting to be discovered. Continuing use of DDT and other persistent organochlorine agricultural compounds (such as dieldrin, heptachor and endrin) has implications for gulls, terns, shorebirds, falcons and other raptors, which migrate to South America, or eat prey that does.

équipes dans d'autres parties de l'Amérique du Sud. Nous devrions ainsi établir un tableau global de la contamination chimique des oiseaux de rivage migrateurs.

Dans le Cadre d'une étude semblable réalisée en collaboration avec le Service des pêches du Chili et un professeur d'université de ce pays, on a examiné les concentrations de métaux lourds dans les oiseaux de rivage résidants et migrateurs se trouvant dans les environs de la décharge marine d'une mine de cuivre. L'examen complet de l'écosystème et de la chaîne alimentaire faisait partie d'une étude chilienne plus vaste visant les effets des effluents de mine de cuivre sur un écosystème marin. L'occasion s'est également présentée d'inclure une étude sur la contamination agricole et industrielle d'un estuaire situé ailleurs au Chili.

De telles études peuvent nous aider à comprendre les problèmes que pose la contzmination chimique pour un autre oiseau migrateur, le Faucon pèlerin. L'étude d'oeufs de faucon pondus aux Etats-Unis et au Canada au cours des dernières années nous a permis de constater que cestains oiseaux libérés et des populations sauvages ont continué d'accumuler des résidus élevés de composés organochlorés comme le DDE (produit de décomposition du DDT qui cause l'amincissement des coquilles d'oeufs), même si l'utilisation du DDT est restreinte au Canada et tout à fait interdite aux Etats-Unis.

Les efforts déployés pour réintroduire la sous-espéce *anatum* dans son ancien territoire au Canada auront peu d'effet si cette dernière assimile du DDT, du DDE et d'autres résidus dans les aires de migration et d'hiver. Nous savons cependant que les Faucons pèlerins s'attaquent fréquemment aux oiseaux de rivage. Les Faucons pèlerins et leurs proies fréquentent des zones côtières servant trop souvent, ici comme en Amérique latine, de lieu de décharge délibérée ou involontaire de déchets industriels et agricoles.

Depuis quinze ans, le DDT n'est plus à la mode en Amérique du Nord et en Europe occidentale, en raison de la résistance des organismes nuisibles ou d'effets secondaires

On Caimare Chico Beach, Columbia, Dr. C. Casler, University of Zulia (Venezuela), Gaston Tessier, Canadian Wildlife Service, and Jose Lira, Assistant to Dr. Casler, examine Royal and Caspian terns banded in Canada and the U.S.A. Photo by Hans Blokpoel

A la plage de Caimare Chico en Columbie, le docteur C. Casler de l'université de Zulia (Vénézuela), Gaston Tessier SCF et José Lira, assistant au docteur Casler, examinent les Sternes royales et caspiennes baguées au Canada et aux Etats-Unis. Photo par Hans Blokpoel.

Once we identify pollutant sources, we can begin to assist wildlife agencies in Latin America in their efforts to have use patterns modified, and to have the uses of these chemicals limited only to those for which no alternatives are available. Such restriction was the strategy Canada adopted in 1969 and it may be the most practical solution in countries where expensive, more toxic and less persistent chemicals pose economic and social problems.

Tern Winter Ecology

For three years, a CWS team worked with their counterparts in Trinidad and Venezuela to study winter ecology of Common Terns. The Great Lakes population of Common Terns has declined in recent years and studies there have not clarified the reasons. Some answers might be found on the wintering grounds. The Canadian team placed brightly-coloured wing markers on 1000 Common Tern chicks and adults from the Toronto-Niagara area and we distributed a note, in Spanish, Portuguese, Dutch, French and English throughout Latin America, asking for reports of sightings.

Information has come in from Venezuela, Peru, Colombia and El Salvador. Further data on the migration path have come from the

écologiques. Cependant, la production annuelle de DDT n'a pas changé considérablement depuis le début des années 50; on a simplement déplacé les lieux de fabrication et d'utilisation un peu plus vers le sud, plus près de l'équateur.

Les biologistes d'Amérique latine connaissent les problèmes causés par l'utilisation répandue du DDT dans les régions tempérées de l'hémisphère nord au cours des années 50 et 60. Cependant, la nature et l'ampleur des problèmes dans les parties tropicales et tempérées d'Amérique du Sud sont beaucoup moins connues, bien que beaucoup de gens soupçonnent que les problèmes existent mais n'ont pas encore été mis au jour. L'utilisation continue du DDT et d'autres composés agricoles organochlorés persistants (comme le dieldrine, l'heptachlore et l'endrine) a des répercussions sur les goélands, les sternes, les oiseaux de rivage, les faucons et d'autres rapaces, qui émigrent en Amérique du Sud ou qui se nourrissent de proies qui, elles-mêmes, émigrent dans ce secteur.

Une fois que les sources de polluants auront été déterminées, nous pourrons commencer à aider les organismes fauniques d'Amérique latine à modifier les schèmes d'utilisation et à limiter les utilisations des produits chimiques

many sightings in Florida, Alabama, Mississippi and Louisiana. About 100 marked adults have returned to their Great Lakes nesting areas.

The team did not see any marked Common Terns in Trinidad, but it did prove remarkably easy to capture terns, many of which were banded. Enquiries at the US Bird Banding Laboratory determined that they came from colonies along the northeastern seaboard of the US. Many were underweight and in poor physical condition, so the team concluded they had difficulty obtaining food.

Results from Venezuela have not yet been analysed. In spite of two reported sightings prior to the trip, the CWS/Venezuela team did not see any marked birds in 1983. Possibly the northern coast of Venezuela is a migration stopover point, and the true wintering area is elsewhere, perhaps farther south on the Pacific coast.

Scientific and Technical Education

The Latin America program also assists with further scientific and technical education of biologists. Biologists, one each from Trinidad, Suriname and Venezuela spent a month in Canada learning the theory and practice of bird banding. After several weeks at the North Point shorebird banding station on James Bay, they spent time at the CWS Bird Banding Office learning how Canada runs our bird banding and retrieval system. After a working visit to a waterfowl banding station, they returned home. The Venezuelan has instituted a Tree Duck banding program and the Surinese biologist has used the capturing techniques in her work with the Cock of the Rock. The Trinidadian expects to implement a banding program on the island. CWS plans more cooperative work with these countries.

A second education project sponsored in part by the LAP, is the production of a Spanish version of the Wildlife Society manual *Wildlife Management Techniques*, the most widely-used wildlife management and technique reference text in North America. Several government and private international conservation groups have contributed to cover translation costs. The US National

en question aux cas où il n'y a pas de produits de remplacement. En 1969, le Canada a adopté une telle stratégie de restriction. Il s'agit peut-être de la solution la plus pratique dans les pays où des produits chimiques coûteux, plus toxiques et moins persistants posent des problèmes économiques et sociaux.

Conditions écologiques hivernales des sternes

Pendant trois ans, une équipe du SCF a collaboré avec des gens de Trinité et du Vénézuela à l'étude de l'écologie hivernale des Sternes communes. La population de Sternes communes de la région des Grands lacs a baissé au cours des dernières années et les études effectuées n'ont pas permis d'expliquer entièrement le pourquoi. Il est possible que l'on trouve certaines réponses dans les territoires d'hiver. L'équipe canadienne a posé des marques alaires sur 1 000 adultes et jeunes Sternes communes dans la région de Toronto et de Niagara, et nous avons distribué une note, en espagnol, en portugais, en hollandais, en français et en anglais, dans toute l'Amérique latine pour demander de signaler toute observation. Des renseignements complémentaires concernant les voies migratoires ont été obtenus par suite de nombreuses observations en Floride, en Alabama, au Mississippi et en Louisiane. Environ 100 adultes marqués sont retournés dans la région des Grands lacs.

L'équipe n'a pas vu de Sterne commune marquée à Trinité mais a eu beaucoup de facilité à capturer des sternes, bon nombre desquelles étaient baguées. Des demandes de renseignements au US Bird Banding Laboratory nous ont permis de déterminer que beaucoup d'entre elles avaient été baguées dans des colonies situées sur les côtes nord-est des Etats-Unis. Puisque bon nombre des sternes capturées présentaient un poids insuffisant et étaient en mauvaise condition physique, l'équipe a conclu qu'elles avaient eu de la difficulté à se nourrir.

Les résultats provenant du Vénézuela n'ont pas encore été analysés. Malgré les deux observations signalées avant l'expédition, l'équipe du SCF et du Vénézuela n'a vu

Wildlife Federation will handle printing and subsequent sales of the book in Latin America. This project could have an enormous impact on wildlife conservation there, as techniques manuals and wildlife conservation texts in Spanish are non-existent.

Habitat Conservation and Mapping

Habitat loss may be the most serious Latin American conservation problem. Alarming statistics published in biological journals record the accelerating loss of tropical forests. To traditional shifting, slash-and-burn agriculture, and logging for timber and pulp must be added the removal of trees for tourist development, and the settlement of landless people from overcrowded cities and failed farms in the lowland forests. Loss rates vary from country to country. In Belize and El Salvador, there has been almost a complete loss of tropical rain forest. Little if any of Central America's forests will remain by 1990 and Colombia's lowland forest, Ecuador's Pacific coast forest and Brazil's eastern and southern Amazonian forests in Mato Grosso, Para and Rondonia will be mostly gone by the 1990's. This will almost certainly affect survival of the 100 or so species of passerines (warblers, sparrows, flycatchers and others) and other forest dwelling birds that breed in Canada and migrate to Central America, the Caribbean and northern South America.

aucun oiseau marqué en 1983. Il est possible que la côte septentrionale du Vénézuela soit une halte migratoire et que le véritable territoire d'hiver se trouve ailleurs, peut-être plus au sud sur la côte du Pacifique.

Formation scientifique et technique

Le programme d'Amérique latine aide également à assurer aux biologistes une formation scientifique et technique plus poussée. Trois biologistes de Trinité, du Suriname et du Vénézuela ont passé un mois au Canada à apprendre la théorie et les pratiques concernant le baguage des oiseaux. Après des semaines à la station de baguage des oiseaux de rivage de North Point, à la baie James, ils ont passé quelque temps au bureau de baguage des oiseaux du SCF pour apprendre comment fonctionne notre système de baguage des oiseaux et de récupération des bagues. Après un séjour dans une station de baguage de la sauvagine, ils sont retournés dans leur pays. Le représentant du Vénézuela a établi un programme de baguage des dendrocygnes et la biologiste du Suriname s'est servie des techniques de capture dans son travail relatif au Coq de roche. Le représentant de Trinité prévoit appliquer un programme de baguage dans l'île. Le SCF projette d'autres travaux coopératifs avec ces pays.

Hans Blokpoel and Gaston Tessier of CWS looking for common tern roosting areas on La Boquilla Lagoon, Columbia. Photo by Hans Blokpoel

Hans Blokpoel et Gaston Tessier de SCF cherchent les endroits ou se perchent les Sternes communes à la Boquilla, Lagoon en Columbie. Photo par Hans Blokpoel

Concerns have been expressed about the actual and potential loss of wetlands in Latin America. Of 225 bird species nesting in Canada and migrating to Latin America, 100 depend on the continued presence and high quality of freshwater and brackish lakes and wetlands, and coastal and inland beaches. Industrial societies in both hemispheres tend to use wetlands as waste disposal sites or regard them as suitable only for drainage and clearance for housing, agriculture or industrial purposes. Migrant and indigenous wildlife species suffer when such destruction of habitat takes place. Education and immediate conservation measures are needed to prevent or mitigate such schemes. Identification of these lands as important stopover and/or wintering areas for migrant birds will lend international support to local conservation efforts.

Another way to draw attention to the important wetlands in Latin America is through the international wetland mapping and identification program now being organized by the International Waterfowl Research Bureau (IWRB) and the International Council for Bird Preservation. Delegates to the IWRB meeting in Edmonton in May 1982 enthusiastically endorsed the proposal for a continent-wide wetland inventory to be conducted in cooperation with Latin American governments and other organisations. Chile is the only Latin American country to ratify the Ramsar Convention on the Protection of Wetlands of International Importance. This international undertaking will help draw attention, on a local and international scale, to the cause of wetland conservation. It may also help persuade other countries to sign the Ramsar Convention.

We do not expect to solve all the conservation problems of Latin America, nor do we intend to try. What we have planned is to work with agencies there to identify problems affecting the birds we share with them and to work with them toward solutions.

Iola Price
Canadian Wildlife Service
Ottawa

La production d'une version espagnole du livre de la Wildlife Society intitulé *Wildlife Management Techniques*, l'ouvrage de référence sur l'aménagement de la faune et les techniques connexes le plus utilisé en Amérique du Nord, est un deuxième projet éducatif commandité en partie dans le cadre du PAL. Plusieurs organismes gouvernementaux et des organismes de conservation internationaux privés ont participé aux frais de traduction. La US National Wildlife Federation s'occupera de l'impression et de la vente du livre en Amérique latine. Ce projet pourrait avoir une répercussion énorme sur la conservation de la faune dans cette région, car il n'existe pas de manuel de techniques ni d'ouvrage sur la conservation de la faune en espagnol.

Conservation et cartographie des habitats

La perte de l'habitat est peut-être le problème écologique le plus grave en Amérique latine. Des statistiques alarmantes publiées dans des journaux biologiques illustrent la perte de plus en plus rapide de zones de forêt tropicale. Aux activités classiques d'agriculture itinérante (d'abattage des arbres suivi de leur brûlage) et d'exploitation forestière axée sur la production de bois d'oeuvre et de pâte s'ajoutent l'enlèvement des arbres pour l'aménagement touristique et l'installation de personnes sans terre venant des villes surpeuplées et des fermes infructueuses des forêts des basses terres. Les pertes varient d'un pays à l'autre. Au Belize et au Salvador, la perte des forêts pluvieuses tropicales a été presque totale. Dès 1990, il restera peu, voire même plus du tout de forêts en Amérique centrale; la forêt des terres basses de la Colombie, la forêt de la côte du Pacifique de l'Equateur et les forêts amazoniennes de l'est et du sud du Brésil, dans les états et territoires de Mato Grosso,

Para et Rondônia, seront presque toutes disparues dès 1990. Cette situation nuira presque certainement à la survie d'une certaine d'espèces de passériformes (fauvettes, pinsons, moucherolles et autres) et d'autres oiseaux habitant les forêts, nichant au Canada et émigrant en Amérique centrale, dans les Caraïbes et dans le nord de l'Amérique du Sud.

Des inquiétudes ont été exprimées au sujet des pertes actuelles et éventuelles des terres humides d'Amérique latine. Des 225 espèces d'oiseaux nichants au Canada et que émigrent en Amérique latine, 100 dépendent de la présence continue et de la qualité supérieure de lacs et de terres humides saumâtres et d'eau douce ainsi que de plages côtières et intérieures. Les sociétés industrielles des deux hémisphères utilisent souvent les terres humides comme dépotoirs, ou les considèrent comme des lieux ne convenant qu'à l'assainissement et au défrichage pour la construction de logements, ou à des fins agricoles ou industrielles. Les espèces fauniques migratrices et indigènes souffrent d'une telle destruction de l'habitat. Des mesures de sensibilisation et de conservation immédiates doivent être prises pour empêcher ou minimiser cette destruction. L'identification de ces régions, comme aires importantes de repos et de pâture ou territoires d'hiver pour les oiseaux migrateurs, assurera un appui international à la conservation locale.

Il y a d'autres façons d'attirer l'attention sur les importantes terres humides d'Amérique latine telles que le programme international d'identification et de cartographie des terres humides que sont en train de mettre au point le Bureau international de recherches sur les oiseaux d'eau (BIROE) et le Conseil international pour la préservation des oiseaux. Les participants à la réunion de 1982 du BIROE, qui a eu lieu à Edmonton en mai dernier, ont approuvé avec enthousiasme un projet d'inventaire des terres humides qui sera réalisé à l'echelle du continent en collaboration avec les gouvernements et d'autres organisations d'Amérique latine. Le Chili est le seul pays d'Amérique latine qui a ratifié la Convention de Ramsar sur la protection des zones humides d'importance internationale. L'entreprise internationale qu'est l'inventaire projeté aidera à attirer l'attention, à l'échelle locale et internationale, sur la conservation des terres humides. De plus, elle peut encourager d'autres pays à signer la convention de Ramsar.

Nous ne nous attendons pas à résourdre tous les problèmes de conservation de l'Amérique latine, et nous n'essayerons pas non plus de le faire. Ce que nous avons prévu, c'est de travailler avec les organismes de là-bas pour cerner les problèmes touchant les oiseaux que nous partageons avec ces pays et de chercher conjointment des solutions.

Iola Price
Service Canadien de la Faune
Ottawa

Ducks Unlimited Canada

Securing Habitat

Ducks Unlimited Canada's Management Priority

For almost half a century, Ducks Unlimited, North America's largest, private waterfowl conservation agency, has dedicated itself to what it considers the greatest threat facing the continental resource — the restoration of critical Canadian wetlands habitat in those areas which traditionally produce up to 70% of North America's total waterfowl population.

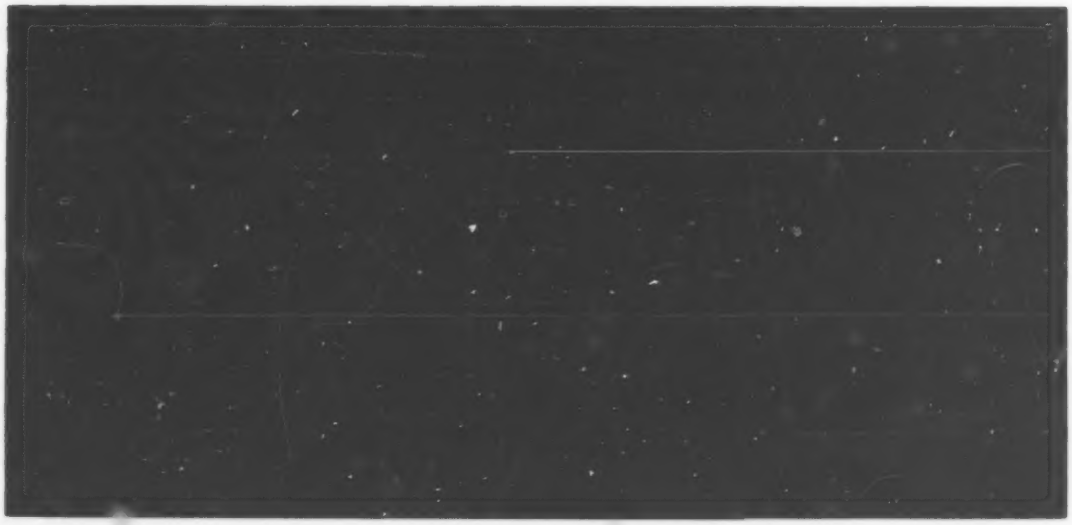
The company's operating philosophy is as straightforward as the solution its North American founders developed to offset the declining waterfowl populations that first attracted their concern during the depth of the 1930's drought. Since the combination of drought and increased agricultural development in the natural wetlands of western Canada were the major factors influencing the population declines, they reasoned, the solution lay in storing and securing enough water on those vital breeding grounds to insure against a recurrence of drought.

For the next 45 years, Ducks Unlimited singlemindedly pursued just such a course of action under its mandate to "restore, preserve and create wetland habitat in Canada."

The company proudly points to some enviable achievements: 2,119 individual projects built from coast to coast and 3.2 million acres of wetlands developed or secured for future project development on land made available free of charge by Canadian corporations, government agencies and individuals.

But while these steadily increasing acreage figures underline DU's continuing commitment to securing habitat, the organization is also aware of the need to adapt to changing conditions.

DU Canada Acting Chief Biologist Terry Neraasen explains that the initial goal of "drought-proofing" the Prairies was an effective rallying call which resulted in significant habitat developments but which, in the crystal clear light of hindsight, proved an impossible dream.



Artificially created nesting islands. Deep moats around islands insulate the nests from predators

Male Ruddy duck in marsh

"Even if there was enough money available to build systems capable of storing enough water to carry us through a drought like we had in the 1930's," Neraasen says, "that volume of water alone wouldn't do the job. Research carried out in the 1970's proved something a lot of biologists suspected — that there's a lot more to producing waterfowl than simply storing water."

For many years, biologists had noted that the carrying capacity of marshes after a natural drought was much greater than its pre-drought levels. The periodic flood/dry cycles on natural marshes that conservationists strove to prevent turned out to play an important role in rejuvenating the productivity of the wetland.

Neraasen explains that defining this phenomenon was one of the more important developments in the field of waterfowl management. Until then, conservationists believed the secret of maintaining habitat lay in simply conserving water.

Development of "drawdowns" as a management tool on "artificial" marshes became a major element in sound waterfowl habitat project design.

Under natural conditions, Neraasen says, marshes undergo periodic flood and drought stages. Man-made marshes, on the other hand, tended to hold stable water levels since supplies are artificially impounded behind dams and dykes, levels are controlled with weirs and spillways and natural evaporation or drought losses are replaced by pumping or some similar artificial supply system.

In time, those artificial marshes can become, in effect, open lakes in which the vegetation that supports wetland wildlife gradually disappears. By periodically, "drawing down," or dewatering these marshes, biologists are able to simulate natural flood/dry cycles, stimulate the natural seed bank in the exposed mud bottom and encourage greater productivity in the area once water levels are restored. This rejuvenates the wetland and causes a burst of productivity.

While drawdown theory is straightforward, its practice can be somewhat complex. Before a drawdown is initiated, biologists take inventory of the state of the vegetation, invertebrate levels, the availability of water to reflood the area and seed populations in the mud bottom.

Drawdowns are usually scheduled for early spring so moist seed beds can be maintained to give emergent vegetation a good start and exposed throughout the season for maximum growth. Areas are generally reflooded the following spring to simulate a one-season drought condition, a common occurrence in waterfowl-producing marshes and a time cycle that minimizes the time the wetland is out of production. In other cases, two growing seasons are required.

Drawdowns have become a standard management procedure on Ducks Unlimited projects during the past 10 years. Cross dykes to compartmentalize large basins to permit drawdowns on certain compartments while others remain productive are standard on new DU projects; water control systems are engineered to permit periodic drawdown; and frequent biological evaluations are carried out on established wetlands to determine when conditions favour a drawdown.

Neraasen explains that while drawdown management simulates natural flood/dry phenomena, managed drawdowns can, in fact, improve on Mother Nature. "Let's say," he says, "we have a wetland that dries out naturally every 10 years or so. Perhaps one out of three of those natural drawdowns produces a good interspersion of emergent plants that persists for a long while. But let's assume that the next natural drawdown is followed by an extraordinary flood year which cancels out all the benefits realized from the drawdown. That sure wouldn't increase the marsh's attractiveness to waterfowl. In fact, it could be no better — and probably worse — than it was before the drawdown."

Neraasen explains that if biologists can carefully control the timing of water removal and return, they can improve on Mother Nature and maintain the area at peak production efficiency.

Other marsh management techniques such as island construction to increase nesting area within a managed wetland or level ditching to provide optimum "open water-vegetation" interspersion ratios are also attempts to simulate natural conditions within an artificial marsh. By understanding the implications of these natural occurrences on waterfowl production patterns, biologists are able not only to simulate natural conditions but even improve upon them.

But "fine tuning" management techniques such as drawdowns, level ditching, nesting island construction and nest box placement programs are secondary considerations within Ducks Unlimited Canada's operating procedures.

The organization's major emphasis remains securing waterfowl habitat first and foremost, then developing those areas to ensure their suitability for waterfowl production.

"Our main concern is habitat," Neraasen says. "Maintaining a habitat base is still the key to the survival of our waterfowl resources."

"Acquisition and protection of habitat is a form of management in itself," he continues. "If we simply sit back and let Nature take its course, wetlands will continue to disappear in the name of progress. When we actively pursue development programs to protect existing natural wetland areas, improve those which are producing at less than potential, and implement public awareness campaigns to underline the universal value of wildlife conservation, we're carrying out a management program."

Local contractor breaking ground for a Ducks Unlimited wetlands conservation program

Still, he foresees the need for greater management emphasis in the future since the challenge remains to maximize production from a diminishing wetland base. "The day is coming," he says, "when we're going to be forced to re-examine areas that we passed by the first time around because the development costs didn't justify the potential production benefits."

Just as inevitable, he predicts, is the day when Ducks Unlimited will not only be concerned with securing additional habitat but with managing it for all it's worth to produce as many birds as possible.

While no one can accurately predict what specific new management techniques will be developed to meet the challenges of the future, most agree the marsh of the future will have to support a diversity of wetland wildlife.

This is already a fact of life in many Ducks Unlimited projects where species other than waterfowl must be accommodated for the benefit of local trappers, fishermen, sportsmen and naturalists. And waterfowl managers will be under increasing pressure to ensure their efforts are compatible with other resource users such as agriculture, forestry and tourism.

According to DU Canada Executive Vice-President D. Stewart Morrison, the trend towards more intensive management has already begun, since the conditions which enabled the organization to so successfully secure land for habitat development after the Great Depression — low land prices and a plentiful supply of "marginal" farm land — no longer exist.

"In many areas," he says, "we've already 'picked off the ripe plums,' the large wetlands that offered maximum habitat enhancement potential at minimum cost. Land costs have soared; demand for land regardless of quality is strong; and landowners are reluctant to make the kind of long-term free easement commitment to waterfowl habitat that has been the backbone of Ducks Unlimited's operations."

Morrison also explains that many of the larger, and therefore more economically attractive, wetland areas are already part of DU's project inventory and that future programs will involve smaller areas requiring higher construction costs. These projects, he says, will require more intensive management to produce enough birds to justify the costs.

Most important, he says, is implementation of a North American continental waterfowl management plan in which Canada, the U.S. and Mexico are prepared to share in the costs of producing and maintaining the international waterfowl resource.

"The past decade," he says, "proves we can develop and refine waterfowl management techniques to maximize production on a given habitat base. At the same time, we've refined the kinds of construction techniques that can improve water management within secured wetland areas."

"But, during that same period, we've made little, if any, headway in countering habitat destruction which is the key to waterfowl survival."

Wood duck nesting box placement program

The time may not be too far off, DU biologists predict, when the word "management" will be added as an equal partner to the "restoration, preservation and creation of prime breeding habitat in Canada" statement of purpose that sums up Ducks Unlimited's conservation philosophy.

But for now, DU's major emphasis will remain, as it has for almost half a century, on the single management technique Ducks Unlimited believes is the most important of all — securing waterfowl habitat.

Carl Radimer
Ducks Unlimited Canada

World Wildlife Fund Canada

Whales Beneath the Ice

An Arctic Conservation Strategy

In 1982, World Wildlife Fund Canada designed and raised the funds for a three year, $750,000 conservation program to conserve Arctic whales. This is the largest single project ever initiated by WWF in Canada. What follows is a description of how the *Whales Beneath the Ice* program took shape, why it is being undertaken, and what results it is likely to achieve.

Introduction

Having considered conservation needs on a global scale, the *World Conservation Strategy*[1] *places the Canadian Arctic in the highest priority category for conservation action. The Strategy* also identifies the first and most important step for ensuring the sustainable utilization of species and ecosystems:

"Determine the productive capacities of exploited species and ecosystems and ensure that utilization does not exceed those capacities."

In contrast, a 1980 Canadian Workshop[2] attended by 26 senior scientists, government officials, private consultants and representatives from industry and native organizations, starkly concluded:

"The present data base is *not* sufficient to allow adequate management of Arctic marine mammals."

In summarizing their comprehensive report[3] to the Government of the Northwest Territories on the present status and future management of Arctic marine mammals, LGL Limited Environmental Research Associates pose this question:

"We can all be very good at managing yesterday's populations. When will we be equally adept at managing tomorrow's?"

Despite their economic and cultural significance to the Inuit, and despite the fact that the world's scientific and popular imagination has been captured by Canada's "white whales" (beluga) and the fable-like "unicorn whale" (narwhal), these and the one other truly Arctic whale (the bowhead which is four times as large as the other two) face very troubling prospects. The bowhead is already officially classified by Canadian and international authorities as an endangered species, i.e., on the brink of extinction. Beluga are seriously depleted by native harvest in many of their known congregating areas, and face further threats from large scale industrial disruption of their estuary and open ocean habitats. The narwhal is almost a total mystery to biologists. We know something about its distribution, but virtually nothing about its abundance or basic biology. Yet, narwhal are heavily harvested, and only about 50% of those struck are recovered.

The World Wildlife Fund Program

In March, 1982, WWF Canada circulated a brief, general proposal to do something about ensuring the future of the world's Arctic whales. The response was overwhelmingly positive, and resulted in a more specific proposal which subsequently drew funding commitments totaling $742,500.

The purposes of the *Whales Beneath the Ice* program are:

1. To identify the most critical conservation needs regarding Arctic whales, and to fund the best, immediate projects that respond to those needs.
2. To use funding attracted by WWF, and the projects supported, as a catalyst or lever to obtain a longer term commitment for research and action from Canadian governments and Canadian native peoples.
3. To use funding attracted by WWF, the projects supported, and the commitment made by Canadians as a catalyst or model for action on the part of other Arctic nations and other international organizations.

The Steering Committee

WWF approached a representative but small group of Canadian experts to serve on a Steering Committee whose job would be to identify conservation priorities, to suggest specific projects, and to supervise those projects over a three year period. Every person approached by WWF agreed to co-operate.

1 The *World Conservation Strategy* (1980) was prepared by the International Union for the Conservation of Nature and Natural Resources (IUCN), with the advice and financial assistance of the United Nations Environment Program (UNEP) and the World Wildlife Fund (WWF). It has been formally endorsed by the Government of Canada.

2 *Report of a Workshop on Arctic Marine Mammals*, Western Region of Fisheries and Oceans, Winnipeg, report published May, 1981 by R.A. Davis.

3 The *Present Status and Future Management of Arctic Marine Mammals in Canada*, LGL Limited, January, 1980.

Beluga Whales. Photo by Janet Foster

The Steering Committee members are: Mr. Ken Beauchamp, Canadian Arctic Resources Committee; Mr. Tom Beck, Canadian Environmental Advisory Council; Mr. Peter Ernerk, Keewatin Inuit Association; Mr. Monte Hummel, World Wildlife Fund Canada; Mr. John S. Loch, Fisheries and Oceans Canada; Dr. Ian McTaggart Cowan, Canadian Committee on Whales and Whaling; Mr. Hugh Monaghan, Renewable Resources, Government of the NWT; Mr. Robert Moshenko, Fisheries and Oceans Canada; Mr. Sam Raddi, Social Services, Government of the NWT; Dr. Ian Stirling, Canadian Wildlife Service.

In addition to the Steering Committee members, two scientific advisors have been extremely helpful: Dr. Ed Mitchell, Arctic Biological Station, Quebec; Dr. Rolph Davis, President, LGL Limited, Environmental Research Associates, Toronto.

WWF convened a two day meeting of the Steering Committee on August 9-10, 1982 in Winnipeg. It was quickly agreed that the conservation priorities for Arctic whales had already been adequately identified by the 1980 Workshop mentioned earlier. Therefore,

the key question became, what portion of this work could the WWF program reasonably undertake? The result of this discussion is the portfolio of eight specific projects outlined below.

Guiding Principles for All Projects

In addition to identifying eight specific projects, the Steering Committee established some guiding principles to apply to each project:

1. Every project must be scientifically sound and lead to some important, specific conservation result. (This means the project rationale must be based on practical achievement rather than "pure research").
2. We should always try to be "opportunistic," i.e., utilize aircraft, research vessels, and existing initiatives in the Arctic to minimize expenses of WWF projects. If "someone is going to be there anyway" doing something else, often we can use the opportunity to have information collected that will be useful to this project.
3. Every project must involve local users (particularly Inuit) in the planning, implementation, and reporting-back stages.
4. High priority should be given to threatened or endangered species and their habitats.
5. High priority should be given to species or populations of special significance as a resource for native northerners.
6. Where WWF has insufficient resources to undertake a top priority task, then our role should be to provide a blueprint for what needs to be done, and to use this blueprint to make sure that the appropriate agency does the job.
7. We should try to spot projects where a relatively small expenditure could produce important results.
8. Every project should be designed so that it either produces results over the funding period by WWF, or can be taken over by another agency to produce results in a longer period. Our role would be to make sure this commitment is made.

Inuit Involvement

Although there are honest differences of opinion about the extent to which native harvest is threatening Arctic whales, there is unanimous agreement that there can be no effective conservation solutions without Inuit involvement.

The native hunter has valuable information not available to southern scientists, based on generations of hunting experience and an all-season presence in the North. Unlike southern biologists, the Inuit are not "ground squirrels" who disappear for the winter. Good conservation work, then, needs the guidance and observations that can be provided only by the Inuit.

No effective "enforcement" of conservation measures in the Arctic is possible without mutual agreement by the users that such measures are needed. It is not politically acceptable to "shove quotas down people's throats," and it is not practically possible given the size of the Arctic.

Native hunters can be a key source of scientific information by reporting on the occurrence of certain whales, and by providing specimens for aging or reproductive analysis. WWF has already cooperated with native hunters and trappers in this regard on projects regarding Arctic fox, caribou, narwhal, harp seals, polar bears, muskox and walrus.

Many native hunters have expressed an interest in being trained to gather field information in a way that can be useful to scientists. This can include everything from providing morphometric data to preparing field observations or harvest records in a standardized format. The Government of the Northwest Territories is already doing this, and would like to use the WWF projects to further develop its native training program.

Native land claims are not yet settled in the Arctic, and access to wildlife is a concern that has been consistently included in these claims. It is therefore unrealistic and insensitive (if not illegal) to propose management of northern game species without native involvement.

Finally, it is common sense and standard human decency that those who have the greatest stake should have a say in the future of a resource upon which they depend.

For all these reasons, WWF will place top priority on Inuit involvement in the *Whales Beneath the Ice* program. Inuit representation is included on the Steering Committee for input into project planning, supervision and evaluation. Inuit game councils and hunting and trapping associations will be contacted for advice and agreement on project implementation, and for ideas on how natives can be involved in the field work. WWF will be careful to choose project co-ordinators and field personnel who have a good reputation in terms of working with native residents. Every project will have as a condition that reports are made back to any community members who have expressed an interest in the results of WWF work.

The Specific Projects

Using the principles outlined above, the Steering Committee identified eight specific projects which make up the *Whales Beneath the Ice* program, two on beluga whales, two on narwhal, and four on bowheads. Only the project objectives are outlined here. Complete details on the project rationale, conservation significance, methodology, budget and field personnel are available from WWF Canada.

Beluga Projects:

1. **Critical Estuary Study** — to discover why beluga whales congregate in estuaries and what properties of estuaries are most important to the whales. Funding: $252,000.
2. **Marking/Tagging Study** — to develop a method of marking or tagging that works (and which could apply to narwhal and bowheads as well). Funding: $40,000.

Narwhal Projects:

3. **Aging Study** — to develop a technique for aging narwhal that works (and could possibly apply to belugas and bowheads as well). Funding: $25,500.
4. **Distribution/Abundance Study** — to help determine the numbers of narwhal in the eastern Arctic. Funding: $150,000.

Bowhead Projects:

5. **Critical Area Study** — to confirm occurrence of concentrations of bowheads on north Baffin, then survey the most promising area for numbers, patterns of use and behaviour. Funding: $225,000.
6. **Impacts of Noise** — to design a project for testing the effects of industrial noise on bowheads. Funding: $10,000.
7. **Eastern Arctic Population Update** — to write up, publish and circulate current information updating the assessment of this population. Funding: $2,500.
8. **Western Arctic Population Assessment** — to publish and circulate an assessment of the status of this population, and to outline specifically what further work needs to be done to provide a scientific basis for the Minister's decision about native harvest. Funding: $12,500.

Why WWF?

Conservation of Arctic whales may be an urgent and worthwhile project, but is WWF the best organization for the job?

No. It is the responsibility of the Federal and Territorial governments, and the Inuit to actually do the job, not WWF. Our role is to make sure they accept that responsibility and act on it.

Everyone involved will freely admit that to date the job has not been done. But there are specific plans and sincere intentions all round to change this. In short, the time is ripe for some mutual support, for a co-operative effort to get on with it. WWF believes we can provide the spark to bring the concerned parties together and to get some crucial initiatives underway which can produce early results, or be readily taken over by the agencies that must inevitably do the job. None of this work will "sit on the shelf." It will have been designed from the beginning to be useful, or to be taken over. We believe this initial push deserves the support of all Canadians — private funding agencies, industry, and WWF.

World Wildlife Fund Canada is one of 27 national WWF organizations which in total have raised over $120 million for conservation. The Canadian organization's unique international responsibility has been conservation in the Arctic. Since 1979, we have raised over $3 million for 250 specific projects across Canada. The *Whales Beneath the Ice* project will be the largest single initiative so far by WWF in this country.

The international scientific advisory group for WWF is the International Union for the Conservation of Nature and Natural Resources (IUCN), made up of over 500 government and non-government members. IUCN houses commissions manned by more than 1500 scientists from around the world. Therefore, WWF is in a unique position to bring a program like *Whales Beneath the Ice* to the attention of the international community and to get action from other Arctic nations. This has already been done for numerous other major conservation concerns such as Project Tiger, The Seas Must Live, Save The Rhino, Operation Panda, and the current Tropical Forest Campaign.

Here in Canada, we believe we have a reputation for sound conservation work which has earned the respect of scientists, government officials, and other non-government conservation organizations. The strength of our Steering Committee for the Arctic whales project, for example, speaks for the diverse Canadian group which we are able to pull together to work on a common concern.

But, in the end, WWF does not exist to build yet another large organization, steering committees, commissions, or the like. We are here to produce tangible conservation results for the benefit of mankind and the other inhabitants of the earth. Surely this concern can now be extended to the Arctic's whales?

Monte Hummel
World Wildlife Fund Canada

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